TECHNOLOGY DEPARTMENT

FLYING

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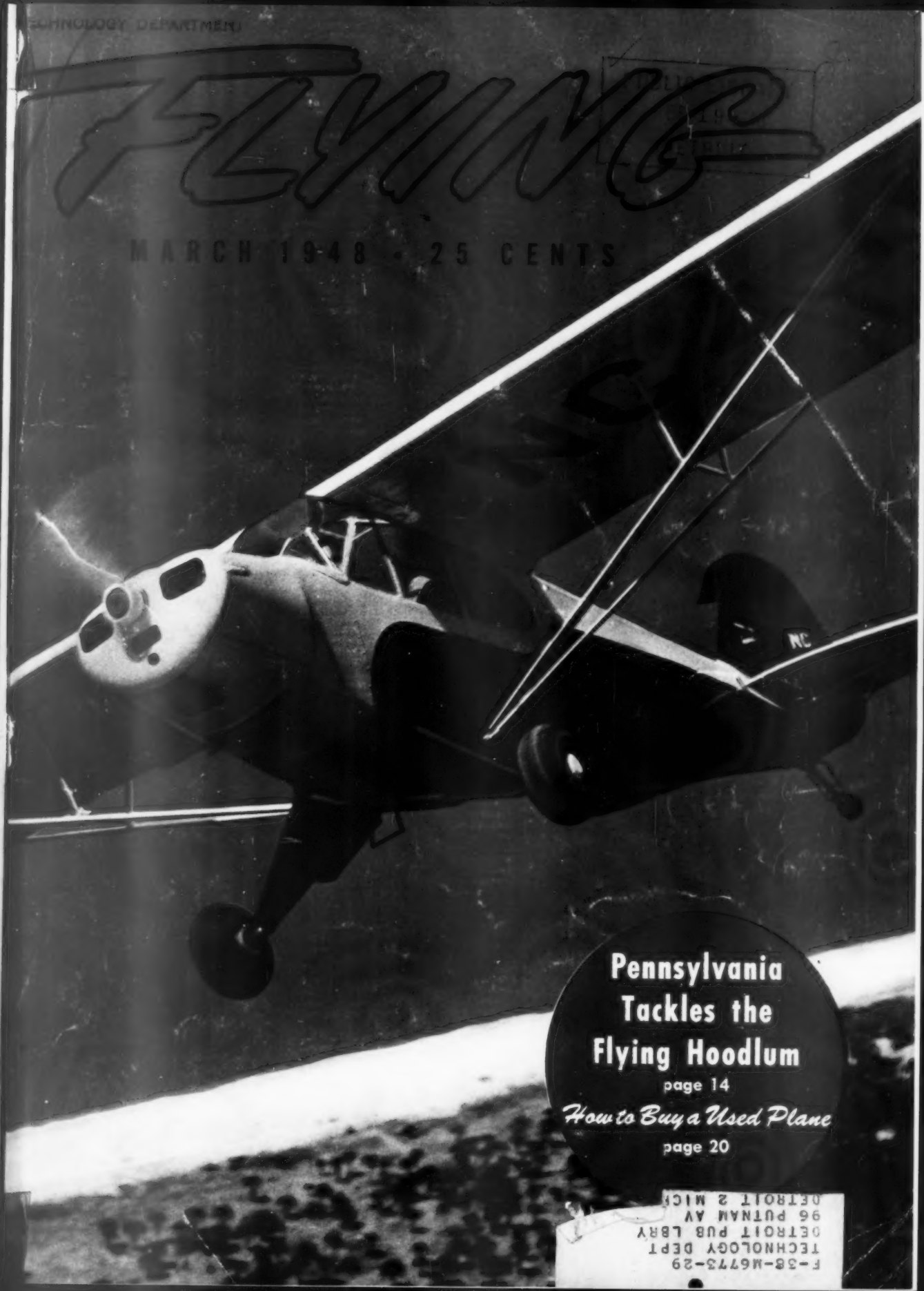

Pennsylvania Tackles the Flying Hoodlum

page 14

How to Buy a Used Plane

page 20

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Here's why so many business men are buying and flying

America's No. 1 Utility Plane

MANY a middle-aged business man has told us, "I'm too old to learn how to fly"—only to find himself soloing a Stinson after about 10 hours' easy flying time!

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Stinson *utility* counts even *more* with these practical people. The Stinson carries the highest useful load of any 4-place plane built today. It carries 4 people and 100 pounds of luggage...or the pilot alone plus 640 cargo-pounds.

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For literature, write Stinson Division, Dept. D, Consolidated Vultee Aircraft Corp., Wayne, Michigan.

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For 22 years, builder of America's most useful personal planes

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2. "One rush delivery of the small springs we manufacture kept a customer's plant from closing down, and resulted in doubling our business with that firm," he adds. "That one flight alone more than paid the cost of my plane."

3. "I have more time with my family, too," Mr. Smith concludes. "The four of us take many pleasant trips in the Stinson. We feel it's safer than traveling by highway. There's nothing like a Stinson for fast, comfortable family travel!"

Stinson dealers have a new free flight instruction plan for business and professional men interested in saving time and money. Write W. H. Klenke, Jr., General Sales Manager, Stinson, Wayne, Michigan.

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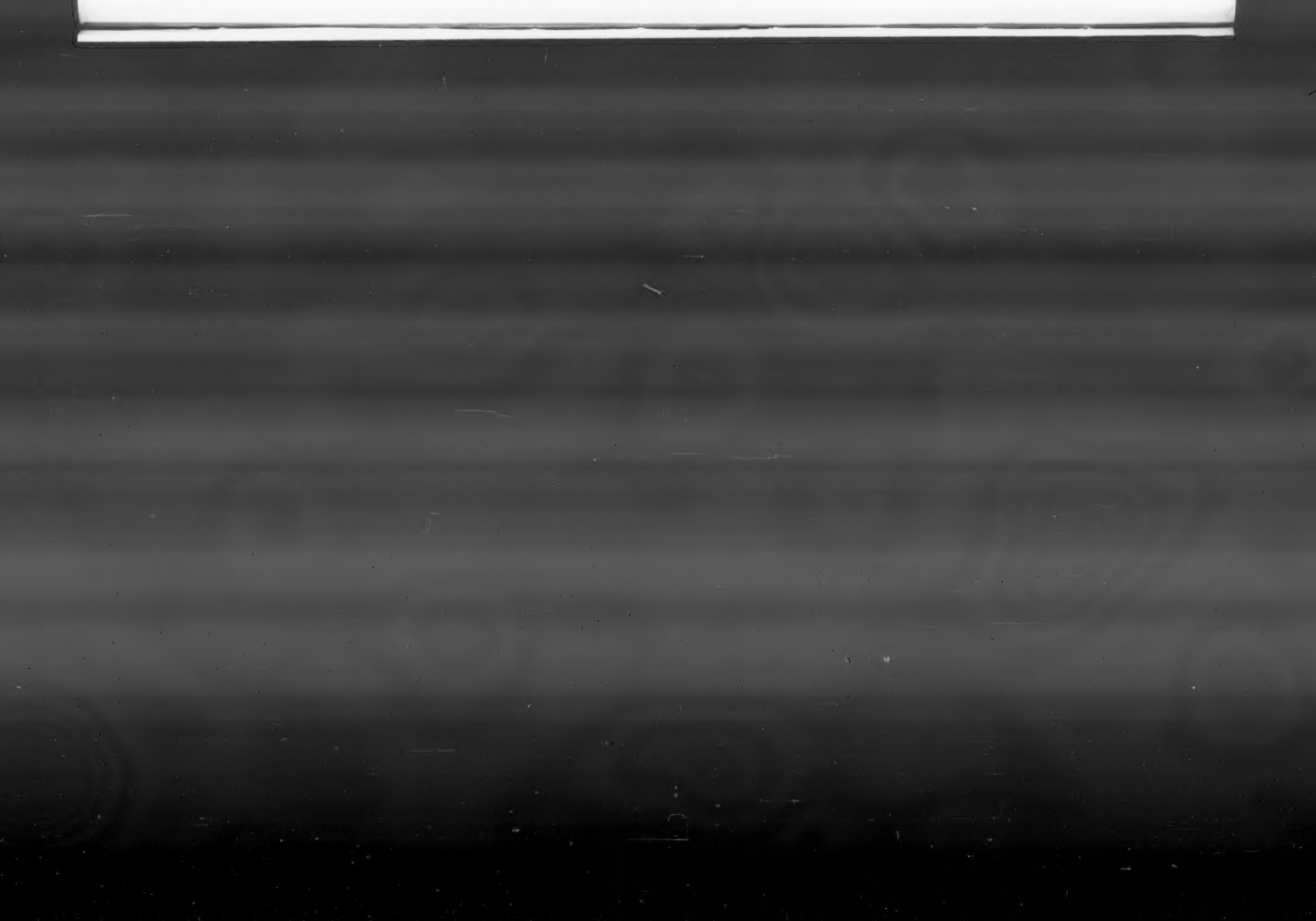

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DETROIT

Martin Aircraft Company mechanic installs electric rubber on the Martin 2-0-2.

Where ice made metal melt

ICE THAT FORMS on an airplane's air scoop chokes off the air that cools the generator. And without air, heat can build up until insulation and even metal melt—and the generator burns up.

This was always a serious problem for pilots and mechanics. But it was licked the day B. F. Goodrich engineers came up with electrically heated rubber. This thin, tough rubber has wires imbedded in its core which distribute heat uniformly over its entire surface. The hot rubber keeps ice from forming on the narrow intake, and the generator gets a continuous flow of cooling air.

In the picture above, a mechanic is installing B. F. Goodrich electric rubber on the generator oil cooler duct of the Martin 2-0-2. This is an easy job because the rubber is very flexible and fits curved surfaces tightly and smoothly. After it is cemented on, the pair of wires that carry power from the generator are connected—and the installation is complete.

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THE COVER: Piper Cub banking over Atlantic coast. Photo by Hans Groenhoff.

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FLYING

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DATA ON HELLCAT PICTURE

Your photograph of the landing approach of a *Hellcat* on page 56 (November issue) was interesting since someone (probably in Navy Public Relations) gave out the caption data indicating this photograph was made with an automatic movie camera behind the pilot. (See photo below.)

I was project supervisor for this training film and that is exactly the effect we wanted because young, would-be carrier pilots are apt to sleep through most training films.

Actually, the production procedure on this shot was as follows: we made a series of landings and wave-offs on the *U.S.S. Ranger* using an SB2C equipped with a Mitchell movie camera. This was mounted on the bomb rack underneath the wing. After we had a satisfactory "set of plates" we went into one of the large sound stages at Paramount and set up a *Hellcat* in front of a rear projection screen. It was mounted on rockers and had the usual three motions of a plane. The lighting on the pilot was matched to that on the rear projection image on the screen and wind machines were placed in front of the plane. The camera which made the composite shot was mounted on a 20-foot boom which rode directly behind the pilot's head.

Resulting sequences gave the pilot the exact attitude, altitude, distances and speed that he should have in approaching a carrier. The student pilot who watched this film knew just what it was going to look like when he made a landing on a carrier.

F. B. KNOOP

Cincinnati, O.

DEFENDS WHITEMAN AIRPARK

"This Is Private Flying" is timely and interesting. The first article appears to be a general summary and I assume subsequent ones will be specific. To be of benefit to the private pilot it should be summarized in a comparative table with ratings.

In your first article a picture was shown exemplifying poor gas service at Whiteman Park, Calif. The picture is more derogatory due to lack of comment. I don't know what the specific criticisms are at this airport, but I wish to offer a rebuttal in advance.

I have rented and flown ships from this airport and have parked my own PT-19. The operators do not always conduct their business to suit my pleasure. That is, we are neither bosom pals nor bed fellows. But, in all fairness, I must state that they give an excellent degree of service and courtesy and the line and pit boys work energetically to do the same thing. They have established parking places for visiting planes with call bell for service. If your writer met with poor service or discourtesy, I am positive it was an isolated instance not common to the field.

I would like to render due credit to the Whitemans for fighting a million-dollar suit to establish an airport for private flyers, and for what I consider excellent courtesy and services.

DR. HARRY R. SALISBURY

Glendale, Calif.

● As Reader Salisbury points out, facilities are excellent at Whiteman Airpark, but Mr. Anderson was merely reporting what happened to him and he did have to wait for service while the mechanic chatted with some friends.—ED.

NO MYSTERY

Referring to "Minor Mystery" on page 70 of your November issue, I think you stuck your neck out when you asked "How did dust get under the tree if the *Cub* flew over it?"

Unless that *Cub* has a buzz saw for a propeller, it did go over the tree and I can think of one good reason, maybe two, to explain the dust under the tree. (See photo below.)

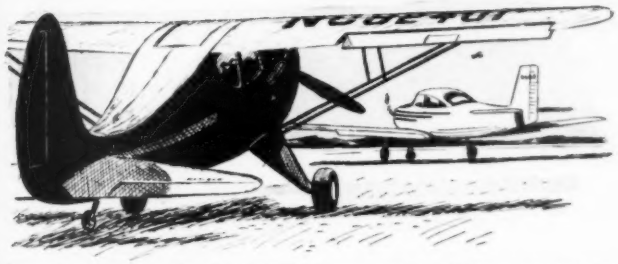
Reason one, as an airplane flies, it beats

the air down with the wings so if there is dust, smoke or fog right under the plane that goes down, too. Reason two, like most duster pilots, Bob Apt waited until the last split second to pull up over the tree. Could be the *Cub* mushed and

(*Continued on page* 81)

Standard of California's

PLANE FAX



A page of service tips for private flyers and fixed-base operators

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. . . **The only all-weather airport** in the world can land and dispatch planes in all fog conditions at Humboldt County Airport, Arcata, Calif. A short time ago a passenger-filled DC-3 successfully performed the first commercial airline all-weather landing when it descended through a thick fog bank to the field. Landing aids include FIDO, ILS, GCA and high-intensity lights. FIDO, which involves burning oil under high pressure, can raise visibility from 75 feet to 300 feet and three-fourths of a mile horizontally in two minutes.

. . . **The 1948 Goodyear Trophy Race** will operate under slightly changed rules at the National Air Races next September. Only important change is in vision requirements. A field of vision of 240° must be provided in the horizontal plane from the pilot's normal sitting position. A minimum of 66 sq. ft. of wing area must be used, including area displaced by the fuselage but excluding flaps, if used. Dry, empty weight must be at least 500 pounds. Foreign entries are eligible provided the planes are built by private enterprise and U. S. built engines holding ATC ratings are used. Inquiries should be forwarded to the Professional Race Pilots Association, 2500 West 73rd Street, Los Angeles 43, Calif.

. . . **New super octane gasoline** which steps up engine power as much as 15 per cent is being used by Navy combat planes. Power increase results in higher speeds, faster rates of climb, and ability to carry greater loads longer distances. The new fuel is considered to be the highest performing gasoline at present that could be produced in quantity during an emergency.

. . . **A miniature autopilot** sensitive to high speeds and abrupt maneuvers, and capable of maintaining sensitive control in any flight attitude, has been developed by Westinghouse. Engineers foresee uses for the 35-pound mechanism in guided missiles and high-speed pilotless aircraft as well as in conventional aircraft control. Its compactness and light weight suggest adaptability to small aircraft, also.

. . . **The human body can endure temperatures up to 250°** for periods up to 14½ minutes, according to experiments carried out in a special heat chamber at the University of California. The chamber was designed to test and acclimatize the body under extreme heat conditions which may occur as jet planes try to reach and pass the speed of sound. If something went wrong with a jet plane cooling system while traveling at 800 m.p.h., the cockpit temperature would increase an estimated additional 115°. Thus far, the researchers have suffered from temporary dizziness, dulling of sensory perception, nausea, perspiration and beet-red skin, but there have been no permanent ill effects.

. . . **Certificates of good aircraft operating practice** were awarded to 433 airports and seaplane bases throughout the country by the National Aeronautic Association. This total, which may be increased by awards to late entries, represents more than five times the number of ports qualifying in 1946. Airports in 33 states are included among the certificate winners, Pennsylvania leading with 62. Nebraska was second with 56 and Connecticut third with 37.

. . . **Air France's new two-deck flying boat,** the *Latecoere* 631, is powered by six 1,600-h.p. Wright Cyclone engines. This luxurious craft (see photo below),

which flies between Biscarosse, France, and Martinique, is nearly 33 feet high, measures about 185 feet from tip to tip and weighs 79 tons. Speed is 186 m.p.h. and it covers the 5,000 miles in 26 hr. 30 min. on a twice-a-month schedule. Although capable of carrying 100 passengers, the *Latecoere* is currently restricted to 46 passengers to provide maximum comfort. There are 15 cabins for two, four cabins for four passengers and a bar-equipped drawing room with seats for 15.

. . . **American-built Nene jet engines** will power the Grumman *Panther* (F9F). (See photo on page 43.) The Pratt & Whitney *Nene* is based on the British-built engine but incorporates numerous changes for production in the U.S. First production model for installation in the *Panther* will be delivered to the Navy late in 1948. END

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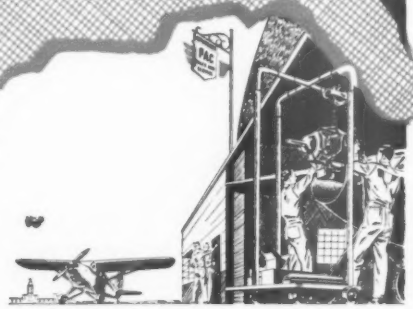

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• • • •

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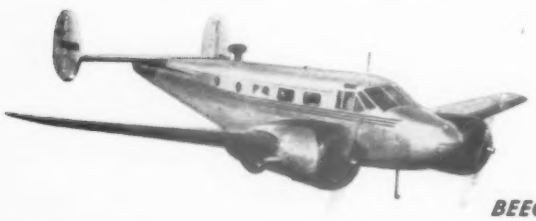

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FLYING
MARCH
1948

Air Power— OUR ONLY INSURANCE

By Lieut. Gen. GEORGE E. STRATEMEYER
Commanding General, Air Defense Command

ALTHOUGH the present unsettled world conditions, wherein the phrases "power politics" and "cold war" are part of our daily vocabulary, are a far cry from the nursery stories of our childhood, we can reach back to Mother Goose for some pretty apt parallels.

I am thinking especially of those three little pigs who so long carried on a defensive war, both "hot" and "cold," against the marauding wolf.

Two of the little pigs, probably operating under the theory that each day would take care of itself and so would the future, built their defenses of wood or straw. When the wolf got good and ready, and finally lost his temper, he moved in. Those two short-sighted little pigs didn't have a chance.

The third little pig was smart enough to profit by experience. He built a strong defense. When the wolf finally attacked, this strategic little survivor of the clan cleverly mouse-trapped the invader and eliminated for all time this menace to the happiness, well-being and democratic way of life in his little world.

Without the use of too much imagination, you can apply this story quite aptly to our own situation in the world today. The United States is the last of the democratic nations capable of building up the power and strategical resources needed to eliminate the anti-democratic enemy, when and if the showdown comes.

Whether that showdown will come in the next year, five years, 20 years or never, will be largely determined by the decision of the people of this country. If we are strong, determined, and fully prepared for any eventuality, no enemy will plunge blindly into a disastrous war. If we are weakly defended and disunited, we will be fair game.

And make no mistake about it—there *is* a "wolf" abroad in the land today. The dissension in the deliberations of the United Nations is more than political muscle-

(*Continued on page 54*)

State-wide coverage enables fast enforcement of CAR. Violations are found through the regular channels of the highway police.

PENNSYLVANIA TACKLES

Aviation's wild-eyed boys get tough treatment as 1,500 state cops help enforce CAA rules.

By WILLIAM WINTER

BUZZ JOBS are virtually non-existent in Pennsylvania since the state police started tracing air code violators.

During early post-war days in Philadelphia, hatred for low-flying hot rock pilots reached fever pitch. Worked up by buzz-job accident headlines and picture features, citizens were having hallucinations that made the flying saucers tame by comparison. Even well-behaved pilots couldn't come within binocular range without triggering a batch of complaints.

Over in Harrisburg, State Director of Aeronautics William L. Anderson was swamped with complaints and frantic telephone calls. A pilot himself, he was disturbed by the senseless monkeyshines and needless fatalities, to say

Form SPCF-131—3-80-47—10,000
COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA STATE POLICE

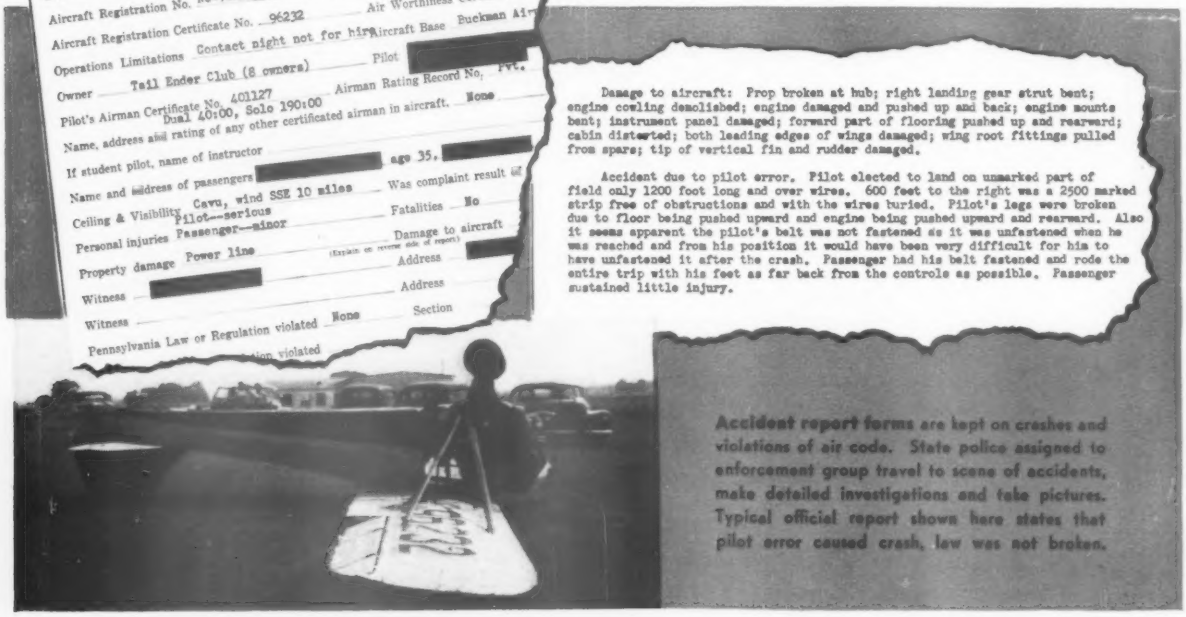
REPORT OF ACCIDENT, OR VIOLATION OF THE AERONAUTICAL CODE OR REGULATIONS

DATE
TROOP
OFFICER

Complainant [redacted] Address [redacted]
Date of complaint 7-26-47 Time 2:10 PM EST Occupa
Date of violation 7-26-47 Time 1:15 PM EST Location
Nature of violation Transient pilot struck power line while making landing ap
Aircraft Registration No. NC-96232 Make Taylorcraft Model BC12-D
Aircraft Registration Certificate No. 96232 Air Worthiness Certificate No.
Operations Limitations Contact night not for hire Aircraft Base Buckman Air
Owner Tail Ender Club (8 owners) Pilot [redacted]
Pilot's Airman Certificate No. 401127 Airman Rating Record No. Pvt.
Dual 40:00, Solo 190:00
Name, address and rating of any other certificated airman in aircraft. None
If student pilot, name of instructor
Name and address of passengers [redacted] age 35, [redacted]
Ceiling & Visibility Cavu, wind SSE 10 miles Was complaint result of
Personal injuries Pilot—serious Fatalities No
Property damage Power line (Explain on reverse side of report) Damage to aircraft
Witness [redacted] Address [redacted]
Witness Address
Pennsylvania Law or Regulation violated None Section
tion violated

Damage to aircraft: Prop broken at hub; right landing gear strut bent; engine cowling demolished; engine damaged and pushed up and back; engine mounts bent; instrument panel damaged; forward part of flooring pushed up and rearward; cabin distorted; both leading edges of wings damaged; wing root fittings pulled from spars; tip of vertical fin and rudder damaged.

Accident due to pilot error. Pilot elected to land on unmarked part of field only 1200 foot long and over wires. 600 feet to the right was a 2500 marked strip free of obstructions and with the wires buried. Pilot's legs were broken due to floor being pushed upward and engine being pushed upward and rearward. Also it seems apparent the pilot's belt was not fastened as it was unfastened when he was reached and from his position it would have been very difficult for him to have unfastened it after the crash. Passenger had his belt fastened and rode the entire trip with his feet as far back from the controls as possible. Passenger sustained little injury.



Accident report forms are kept on crashes and violations of air code. State police assigned to enforcement group travel to scene of accidents, make detailed investigations and take pictures. Typical official report shown here states that pilot error caused crash, law was not broken.

William L. Anderson, executive director of the Pennsylvania Aeronautics Commission, master-minded an air code enforcement program that has reduced state's reckless flying accidents over 50 per cent. State police work under his direction to investigate all violations immediately.

THE FLYING HOODLUM

nothing of bad reputation the buzz boys had given private flying.

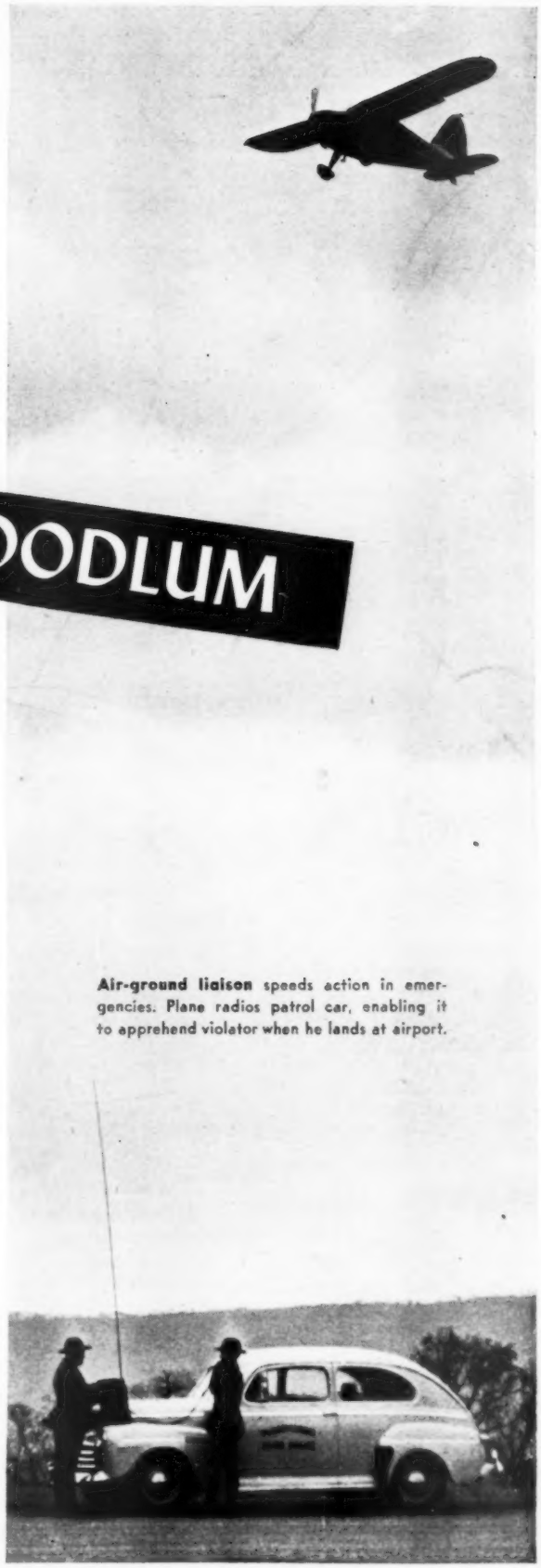
Little help was possible from the CAA—which is supposed to ride herd on such matters. And chasing planes with other planes quickly proved almost hopeless. Even the slowest *Cubs* seemed to vanish into thin air, whereas most of the culprits were flying converted AT-6's and BT-13's. Anderson soon discarded the "aerial police" idea as a high-powered publicity stunt which would require astronomical expense and from 50 to 100 planes.

Instead, he enlisted the aid of the Pennsylvania State Police (paying for the assistance with funds from aviation gasoline taxes). For only $25,000 a year he was able to set up a force of safety and investigative officers which utilized the entire 1,500-man Pennsylvania State Police force.

Anderson's plan not only squelched the Philadelphia uprising within 60 days, but within a year it achieved a remarkable 50 per cent reduction in low and reckless flying and a 55.9 per cent reduction in fatalities resulting from such flying. Since half the private flying accidents at that time fell into the low-and-reckless category it's easy to understand the significance of Pennsylvania's new program.

On the morning of May 4, 1947, for example, a small-town housewife phoned the state police at Reading to complain that a low-flying plane "was endangering the property and lives in her community." On the following morning, a plain-clothes aviation investigator checked the plane's number in the state aircraft registration files. Visiting the field where the plane was based, he determined who was flying it at the time of the violation and, with the thoroughness of a homicide inspector, interviewed eight witnesses in two towns. The pilot had his say. On May 6, the officer filed charges against the pilot of flying recklessly, in violation of Section 44 of the Pennsylvania Aeronautical code. May 7, the defendant pleaded guilty before a justice of the peace and was fined $25 and costs of $7.50. As in most of these cases, it was strongly recommended to the CAA that the man's license be revoked or suspended.

During the first six months of (*Continued on page* 64)



Air-ground liaison speeds action in emergencies. Plane radios patrol car, enabling it to apprehend violator when he lands at airport.

Survival in the Air Age

National defense remains the basic consideration in the important recommendations of the President's Air Policy Commission. Personal aviation would be aided by a program of fundamental research to produce safer, higher-performing airplanes. Planners propose a new and mightier Air Force.

Commission members are (seated, l. to r.) George P. Baker, Thomas K. Finletter, chairman, Arthur D. Whiteside; (standing) Palmer Hoyt and Henry Ford II. Ford later resigned and was replaced by John A. McCone, who is not shown here.

UNPRECEDENTED peacetime activity in military aviation will begin when the long-awaited report of the President's Air Policy Commission is accepted by Congress. The report was made public as this issue of FLYING went to press. So significant are its recommendations that aviation authorities expect it will become the bible of post-World War II aviation, just as was the famed Morrow Board report after World War I. The five-man board headed by Thomas K. Finletter has proposed to blue-print the future of both U. S. military and civil aviation.

The commission calls boldly for a new strategic concept for the United States based upon air power. Instead of a single force in being, the Navy, the United States now needs two fighting branches in being—the Air Arm and the Navy.

The long-range program proposed by the committee calls for strengthening both of these services.

Its program is based upon the premise that other nations will not have atomic weapons in quantity, or the supersonic bombers or guided missiles to deliver them before the end of 1952.

It has, therefore, divided military planning into two parts: Phase I for the period up to the end of 1952, and Phase II for the period after 1952.

In directing the nation's aircraft manufacturing industry, research organizations, airlines, and Government agencies into a more integrated system, national defense is given first consideration in all policy decisions.

The committee proposes no fixed and final program, however. Instead, it recommends that the president appoint a five-man commission every two years to review anew the nation's military establishment and report on its findings.

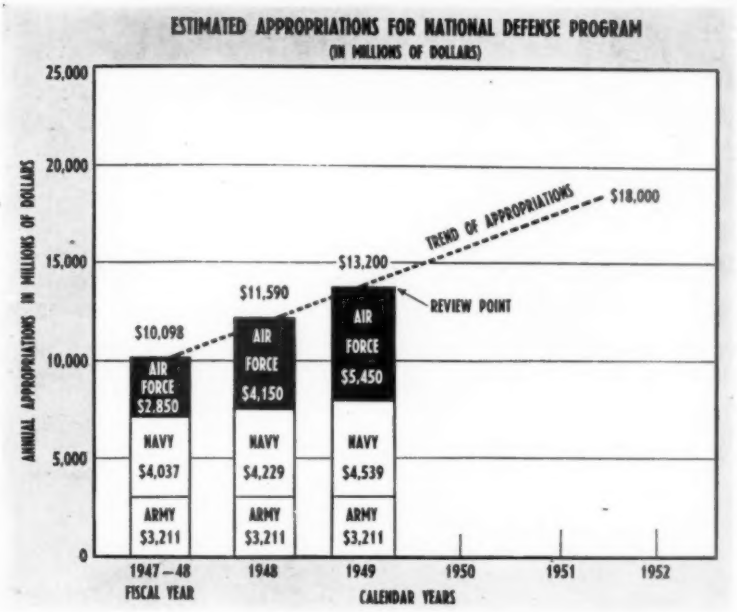
Private flying gets little more than verbal encouragement from the commission's report, although appropriations of billions of dollars are urged for the armed services, and the costs of subsidies to the airlines will certainly run into many millions.

"Personal aviation clearly proved its value to the military services in the last war," declares the commission. "The fact that the nation was air-minded was a national asset . . . The CPTP was especially useful. . . . Private pilots of the Civil Air Patrol made an admirable contribution . . ." etc. . . .

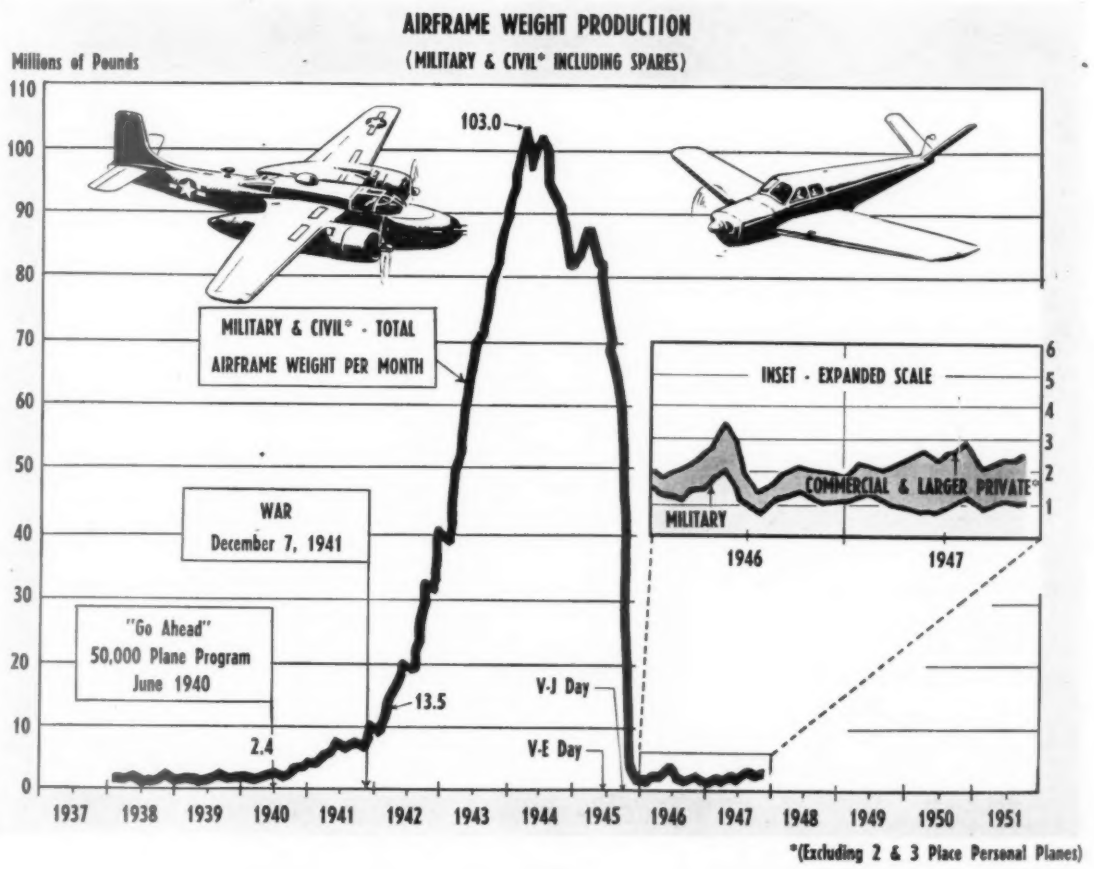
Nevertheless, the report continues, "although instruction skills have historically been valuable to the military, testimony of the armed services indicates that this will not be as true in the future." One reason is the availability of World War II pilots for the next 15 years.

"The taxpayer has contributed generously in the past to personal aviation. Considerable help was given throughout the pre-war years, but the greatest benefits were in the Government-sponsored civilian pilot training in the American colleges. Airport operators in all parts of the country were able to hire new instructors, refurnish and reequip their buildings, improve their airports and in general put themselves on a businesslike basis. The greatest help to the private plane industry was the demand for new airplanes for instruction, purchases of which reached a new peak in 1940 and 1941.

"During the war nearly all manufacturers of personal planes produced aircraft for military purposes, or had subcontracts from other plane manufacturers. They were able to modernize factories and buy equipment that they could not previously afford . . ." (*Continued on page* 60)



Aviation expenditures (see above) would increase markedly in next few years if committee's recommendations are adopted by Congress. More production would aid industry suffering from post-war doldrums (see below).



The Flying Auto Problem

By J. M. GWINN, Jr.

Aeronautical engineer, World War I pilot, Joseph Marr Gwinn, Jr., has been in aviation engineering most of his adult life. He built the experimental Gwinn Aircar, a pioneer two-control non-spinnable craft. Later he did extensive experimenting with roadable airplanes and flying autos as an engineer for Consolidated Vultee Aircraft Corp.

MANY long-term research problems lie between the dream of a flying automobile and its realization.

I want to discuss only two aspects of this problem:

What is a flying automobile?

Is it worth studying?

My purpose is not to design an actual flying automobile but to point out the problems which must be solved in doing that job successfully.

There are two types of a combination automobile-airplane. One is the roadable airplane and the other a flying automobile. I think the former has enough drawbacks to make the latter the logical solution—or at least the solution most likely to be successful—and for one principal reason: the combination vehicle must first be a good automobile.

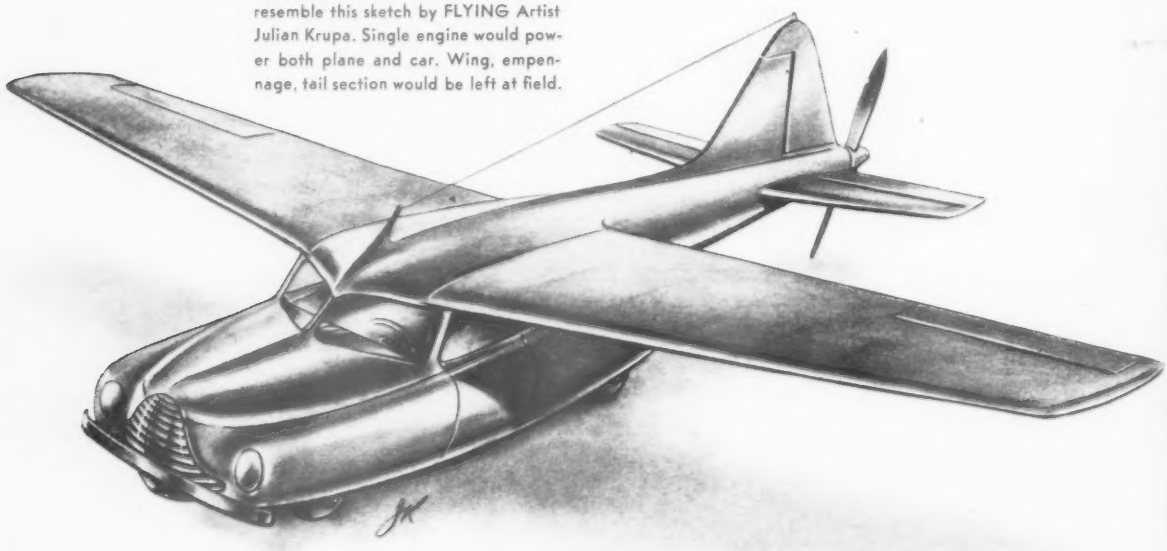
The average automobile owner uses his car every day, usually many times a day. The average private airplane owner is fortunate if he uses his airplane twice a week. Thus, if the combination vehicle is not satisfactory for normal weekday use as an automobile, the owner must also possess a car. This restricts the vehicle to those who can afford two cars, one of which would be of rather high price.

Now to compare the two. The roadable airplane is not likely to be a good automobile if it carries its wings along because it will be unmanageable on the road in a wind of any strength. It would be clumsy on the highway and would have many blind spots in traffic. The danger of collision and damage to the airplane part of the structure would be great.

Since the flying automobile can be a good automobile, I conclude that this is the logical choice. The biggest part of the problem is simply to make it light enough to fly and still be a good automobile.

The idea brings with it one advantage. No longer need the airplane owner be too concerned about the close proximity of his airport. He can afford, with his combination vehicle, to drive some distance out to a large airport and so he can have a vehicle that will fly only from large airports. This makes possible (*Continued on page* 79)

Flying auto proposed by author would resemble this sketch by FLYING Artist Julian Krupa. Single engine would power both plane and car. Wing, empennage, tail section would be left at field.



Landin
on the
City H

Landing in field near Carson City, Dr. McGinnis finds a car waiting on the adjoining highway to carry him and his patient to the Carson City Hospital, upper left. Plane does not have ambulance fittings.

The flying medico stands on wing of his Navion. He finds that just as the automobile expanded the range of the horse-and-buggy doctor, so the airplane is expanding the range of the automobile-doctor.

FLYING DOC

PHOTOGRAPHS BY FRANK FULKERSIN

THE airplane has replaced the motor car in the practice of Dr. W. F. McGinnis, osteopathic physician and surgeon of the small city of Mt. Pleasant, Mich. Dr. McGinnis has been flying for four years and already has his third plane. It is a *Navion* with reinforced nose wheel for rough fields.

Dr. McGinnis uses the plane to visit patients, to make regular trips to the hospital, and as a flying ambulance. His cargo has included small children with ruptured appendixes, mothers in labor, and others. He finds that his *Navion* has expanded the geographical range of his practice so that he is able to make calls over a radius of 30 to 40 miles.

"In emergencies, the plane helps to save lives by getting patients on the operating table less than an hour after I first see them," Dr. McGinnis says. END

Cow-pasture landings are frequent. Dr. McGinnis has a reinforced nose wheel for rough fields. He plans to use skis this winter.

HOW TO BUY *a Used Plane*

Before you buy that used plane, make these simple checks on its condition.

PHOTOGRAPHS BY WALTER STEINHARD

By JERRY LEICHTER

THE BEST BUY for the private pilot who can't afford a new plane is a used plane, whether it's 100 or 1,000 hours old. The market is loaded with good values—and prices are off from $400 to $600 on most lightplanes as compared with a year ago.

In fact, the probable key to the healthy expansion of private flying lies in the used airplane field. It's the one sure way to introduce young, future new-plane customers to personal plane ownership.

The two prime factors that stop most prospective purchasers of new planes are the initial cost and the high price of protective aviation insurance. Both can be cut from 10 per cent to more than 50 per cent on a used plane, depending on the age and market value of the craft. But let the buyer be wary; a bargain involves more than the right price. (*Continued on page* 68)

Landing gear inspection, such as that being made on this Cessna's vanadium steel gear, should include examination of wheels and tires.

Initial conference between Richard Green, Armonk, N. Y., and airport sales manager J. T. Barta is spent checking the planes' records.

General inspection begins as Barta takes the buyer out on the field, where a Stinson 150 and a Cessna 140 have been pulled out of the hangar for examination. As they approach planes, Barta points out general features of each, and the buyer satisfies himself regarding planes' appearance.

Cessna's metal propeller gets careful look. Wooden props should be checked for nicks in the sheath and deterioration of the finish.

Thumb pressure on fabric should not cause sharp cracks. If it does, fabric may be in bad condition and need a refurbishing job.

Wing flap hinges and spring mechanism can be inspected by buyer. Green pulls down the Cessna's flap to check action of the hinges.

Mechanic's inspection is a "must" on any purchaser's list. Ohmmeter is being used to check the condition of the plane's magnetos.

Condition of instruments should be noted by buyer. Prior to demonstration flight, an instructor points out features of the cabin.

Signing option to buy. Green lists all defects he wants corrected before plane is delivered. Clause is included in sale contract.

Meet Gizmo

A fantastic character has been discovered by FLYING's editors. He combines in one unsavory package all the aviation mistakes known to man. His name is Gizmo I. Fleabrain and he is just nuts about aviation. In fact he's just nuts, which makes life a living hell for all his flying associates. Do you want to wrap a wing about a telephone pole? Do you want someone to peer into your gas tank with a lighted match? Gizmo's your man. FLYING hopes that its readers will profit from the errors of this lunatic in later issues. He's what's wrong with aviation.

CARTOONS BY FRANK ADAMS

DANGER on the Airport

Thousands of accidents happen on the ground because pilots drive their airplanes like automobiles.

Tight parking space doesn't bother Gizmo. And he's always confused when he bashes in his wingtips.

By WILFRED OWEN

THE most important thing that airplanes have to do, of course, is fly. How they get along when they're not flying is a down-to-earth matter which no one cares too much about. That's probably the best reason why they don't get along too well.

The fact is that an airplane on an airport is a fish out of water. It gets stuck in the mud, skids off the runway, slips into a ditch, blows a tire, and often winds up unceremoniously in a snow bank. And it goes in for bumping things on a rather broad scale. Taxiing airplanes do most of their colliding with fuel trucks, oil drums, maintenance equipment, stray animals, and each other. Getting into a tight parking place is another way of getting into trouble for sure, and the plane that tries to roll down the runway with its wheels up is really down on its luck.

It's getting so nowadays it's hardly safe not to fly. With only about 5,000 civil airports in the whole country, many of these landing places have begun to look like Main Street during the rush hour. Big planes and little planes, fast and slow, hot pilots and pilots that are not so hot. And unfortunately, most of the people who operate airplanes are amphibious; that is, part of the time they fly and the rest of the time they drive automobiles.

As soon as they get their wheels on the ground they forget their wings and, having been brought up in the automotive tradition, they slam on the brakes, careen around the turns, and race for a parking space that's almost wide enough. The soft shoulder and the open ditch, the slippery pavement and the intersection hold no terror for the Sunday pilot. To the automobile driver in an airplane, these hazards are old stuff.

In most cases the only injuries from these antics are suffered by the pilot's pride and his pocketbook. The modern version of denting a fen- (*Continued on page* 69)

Ground maintenance is expensive, the way Gizmo does it.

Muddy fields meant nothing to Gizmo—until one wet day.

Sky Castle

It looks like a movie set but this $400,000 castle is unique club for sportsmen flyers.

PHOTOGRAPHS BY THE AUTHOR

By DON DOWNIE

FIFTY AIRLINE MILES north of Los Angeles, a $400,000 duplicate of a famed Irish castle is one of California's newest air resorts. Built in the twenties by a wealthy Hollywood realtor, the castle was recently turned into a flying resort by George Carter, now its business manager. A non-profit club with paid memberships (totalling nearly 300), it is open for both Sunday and weekday flights, with as many as 50 planes common for Sunday morning breakfasts. Cafe and bar remain open at all times, and the castle's 16 rooms furnish limited overnight facilities. By summer, 40 motel units, tennis courts, a golf driving range and an artificial lake with sandy beach are to be completed. Sky Castle's 3,200-foot sod landing strip is 14 miles west of Lancaster and 2½ miles northeast of Lake Hughes. There is no landing fee, and gas and oil are available. END

Flyers park planes near landing strip, within walking distance of castle in background. Lazy guests can ride to castle in two station wagons. Top photo shows a Stinson approaching over gate to castle.

Sunday morning flyers are met by a station wagon. Airstrip was built by leveling a pasture near the castle.

Sky Castle welcome is extended to Winston Key and daughter, Windie (left). They will spend the weekend.

Checking in, the Keys sign register for Manager George Carter. Castle was built by a Hollywood realtor.

Main lounge was built on same scale as that of Irish castle. Minor details were duplicated: secret passage under stairway to roof, a fabulous crack (reproduction cost $10,000) in door.

Castle's guest rooms are limited (only 16 now available) but 40 motel units will increase accommodations next summer. Windie Key snaps on light after she and father register at the resort.

Guests relax at bar after a day of flying, horseback riding. Over 50 horses are kept on estate's 1,400 acres. Visitors can also pan for gold, search for relics on old Indian camp site.

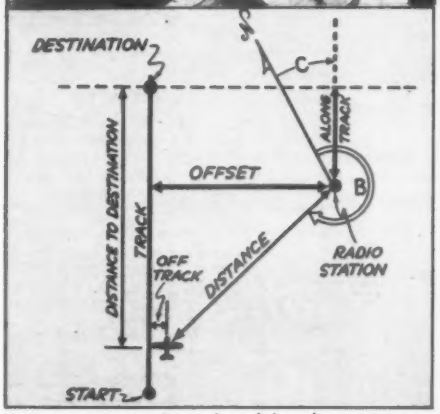
Secret panel in wall of castle is explored by Windie. Manager Carter guides her through passage.

View of airfield from archway in castle shows old reservoir (foreground) where lake is planned.

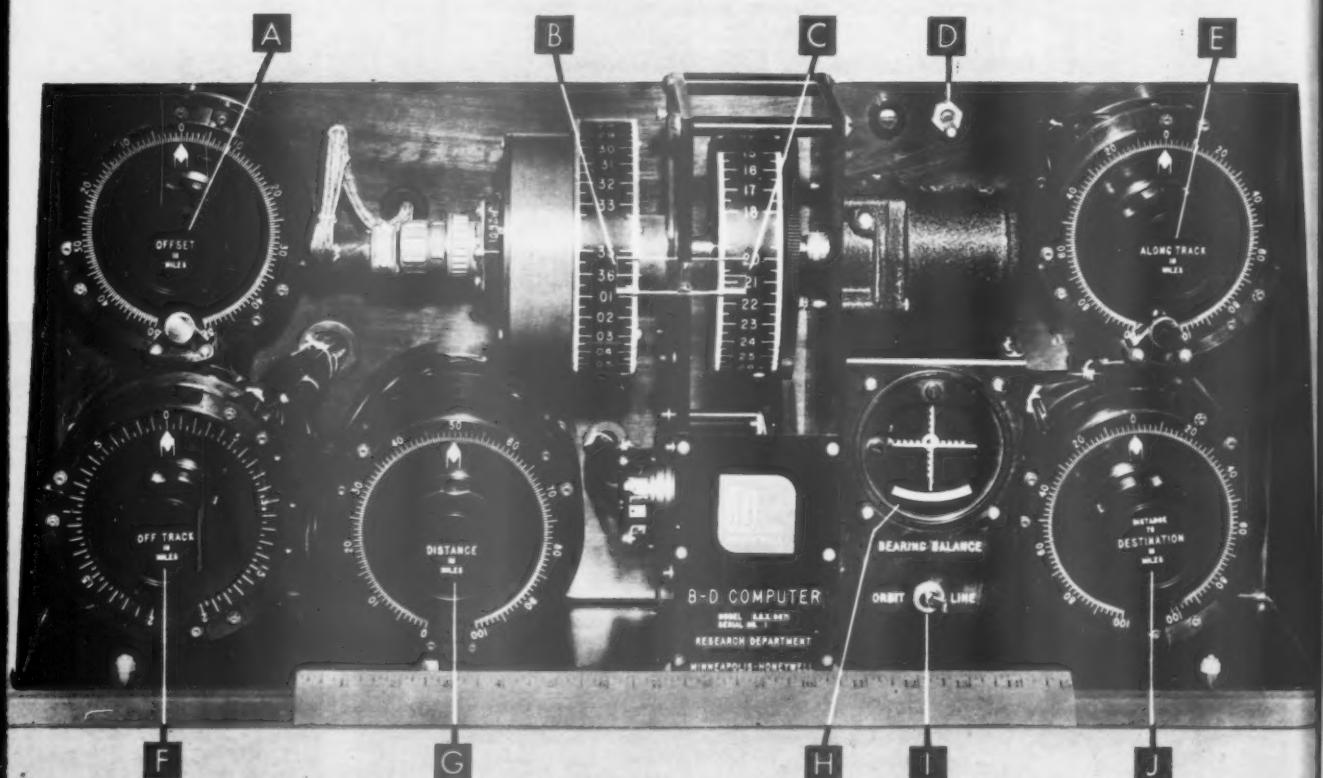
ROBOT HELMSMAN

Magic brain makes possible automatic flight along electronic super airways.

A MAJOR advance toward aerial superhighways has been taken with the new Minneapolis-Honeywell B-D computer, an electric brain which guides aircraft along preset courses. The computer can be flown manually or hooked up with the autopilot. It helps make automatic landings. Using a combination of ODR (omni-directional range) and DME (distance-measuring equipment) it provides constant navigational data accurate to within 500 feet. The computer will permit at least 10 times as many planes to fly the same airways by setting up a system of "tracks" on either side of the centerline route of the airway. Because of positive location along the tracks, planes also may follow each other closer. END



B-D computer in CAA plane (above) operates according to diagram. Instrument receives distance from ground transmitter via DME, and direction via ODR. Using data, computer navigates the plane.



Computer panel was designed for testing and is more complicated than production model would be. On Dial A, the perpendicular distance of the station from the track is set in the instrument by hand. On Dial E is set the other coordinate—the perpendicular distance of the radio station to the line passing through the destination perpendicular to the track. Dial B is set to allow for the course of the plane with respect to true north, and Dial C automatically feeds the bearing of the plane from true north into the computer and gives a visual check. Dial G automatically feeds the distance of the plane from the station into the computer. Dial F automatically gives deviation of plane from assigned track. Vertical needle of Dial H indicates displacement to right or left of assigned track; horizontal needle is not used. Dial J gives distance from destination. D is on-off switch. Switch I provides orbiting course around the radio station.

REPORT FROM WASHINGTON

By FRED HAMLIN

IF THERE was any advanced doubt about how members of the President's Air Policy Commission were thinking, it was dismissed when they released their report under the title, "Survival in the Air Age" (see page 30). We can hope for peace under the United Nations, said the Commission—but we must prepare for a possible war that could open with the lightning thrust of an enemy's air arm.

The future holds bright promise of more and more airports, if the President's commission has anything to say about it— "We recommend Congress appropriate each year the full amount of Federal funds permissible under the Federal Airport Act of 1946."

And there will be more and more research—again if Commission recommendations are followed—with plenty of money to spend on it, both by manufacturers and Government agencies. But don't expect newer, safer lightplanes tomorrow. The billion-dollar proposed program is basically military, the research road is a long one, and the best that can be expected in the lightplane field will be little enough as compared to the efforts in transport and for fighters.

Congressional Board

The President's Commission does not have the last word. After Mr. Truman appointed it, Congress came out with a parallel group—the Congressional Aviation Policy Board. Sen. Owen Brewster is chairman and Congressman Carl Hinshaw vice-chairman. Unlike the President's group, the Congressional is burgeoning with subcommittees and counselors. The Congressmen are also holding only a few hearings, using those held by the President's Commission for background.

They are considerably different from the President's group in that the Congressional Board is loaded with public relations counsels. Even before the Presidential report, newspapermen were invited to a four-ply meeting under Hinshaw auspices and their advice sought. This contrasts markedly with the President's Commission, which took a dim view of publicity either for itself or for those who testified. Fundamental differences between the two sets of conclusions may be economic: Congressman Hinshaw indicated that his Board will probably not be as generous budget-wise as was the Commission. The Congressional Board promised its report for March 1. There is going to be a whale of a lot of debate on it, come spring.

Board Chairman

For a while in January it looked as though Maj. Gen. Laurence Kuter would be the new Civil Aeronautics Board chairman—and that he'd be receiving a comfortable $15,000 per year for his services. That would have beaten the President's Commission to the punch. The Commission recommended that members of the CAB get a raise from $10,000 to $15,000. Kuter was to get special Congressional authorization to get his Army pay, plus some flight time pay, although working in the civilian job.

It would have been a neat trick, and Kuter would have been one of the youngest men to become chairman of the Board. He is 42. But a recalcitrant Senate Armed Services Committee pitched a curve, and refused to approve legislation permitting Kuter to retain his Army rank in the new job. At press time, the President was looking for new material for his CAB captaincy.

Landis

Everybody has his theory about why James M. Landis was not re-appointed to the Board chairmanship. Up until almost the last minute Mr. Landis and lots of other observers in Washington (see Report from Washington for February) thought he would continue on the job. Our information is that he was so assured by the President in a long-distance telephone conversation to Washington when Mr. Truman was in Florida late last year.

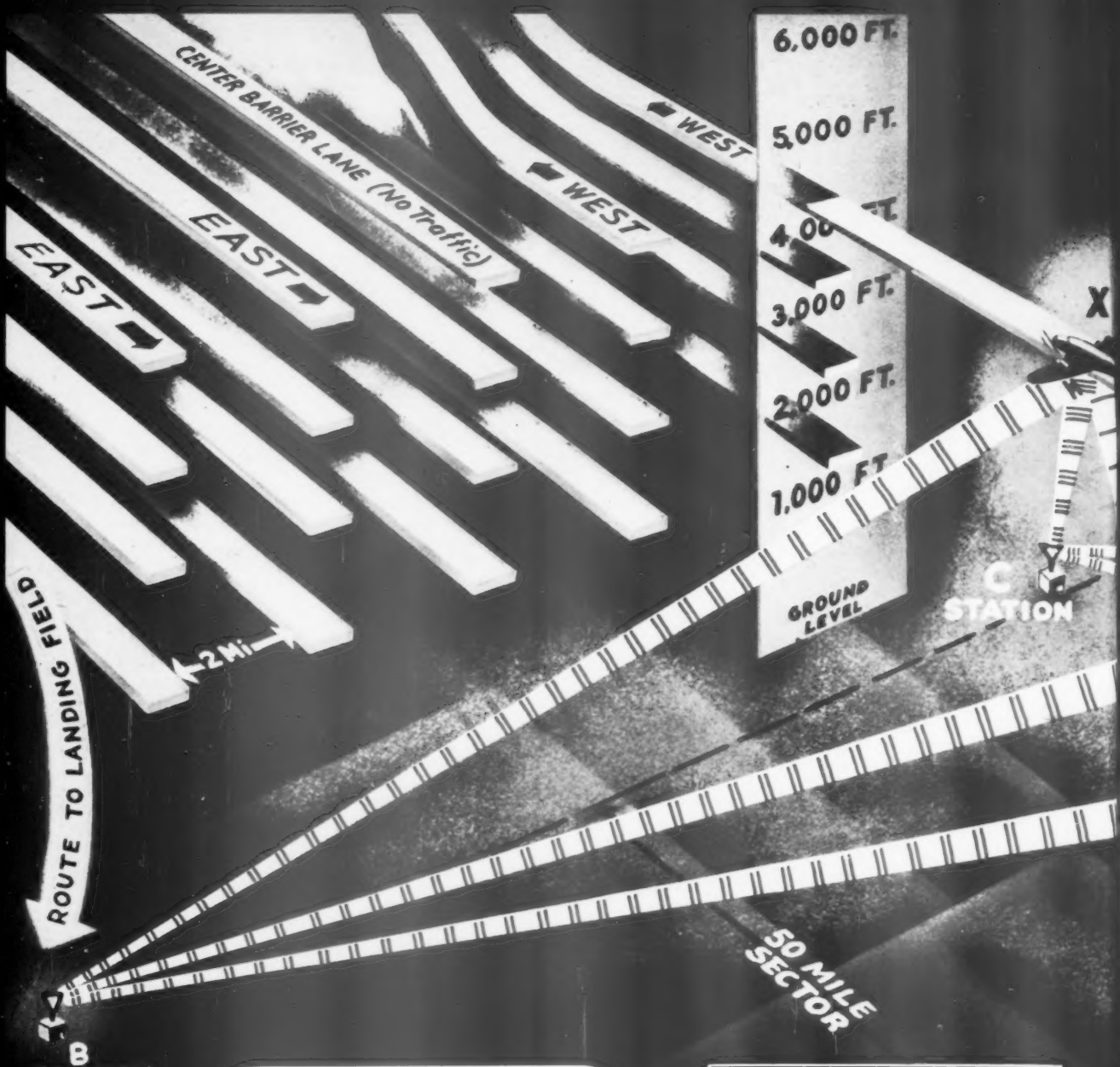
But Landis did not get the nod. Why? His friends give three reasons. Best-known is that he raised hell with the airlines on safety and the airlines didn't like it. During a hearing last fall an airline official told Mr. Landis that if he didn't ease up, the airlines would be unable to carry pay loads. "One more major accident," snapped the CAB Chairman, "and there will be no pay loads whatsoever."

Ousted CAB chief and disappointed candidate made news. J. M. Landis, incumbent (left), was pushed out by President; Maj. Gen. Laurence Kuter had trouble with Senate committee.

A second factor was Landis' opposition to inroads on the Board by the Department of Commerce and the Civil Aeronautics Administration. These Landis opposed firmly. He also publicly and emphatically jumped CAA for not enforcing some safety regulations, notably the Board's take-off formula.

But third and worst was State Department's opposition to Landis, who last summer flew down to Brazil and signed an air agreement with them in a few days after State said it couldn't be done. Then, adding insult to injury, he grabbed a briefcase and a raincoat and flew to England for a week-end during which he persuaded the British high command to come out with a hearty endorsement of the Bermuda agreement, which at the time it looked as if they would junk. State, it turned out, didn't want any part of Mr. Landis.

(*Continued on page 77*)



LEGEND

RADIO PULSES FROM STATION A

RADIO PULSES FROM STATION B

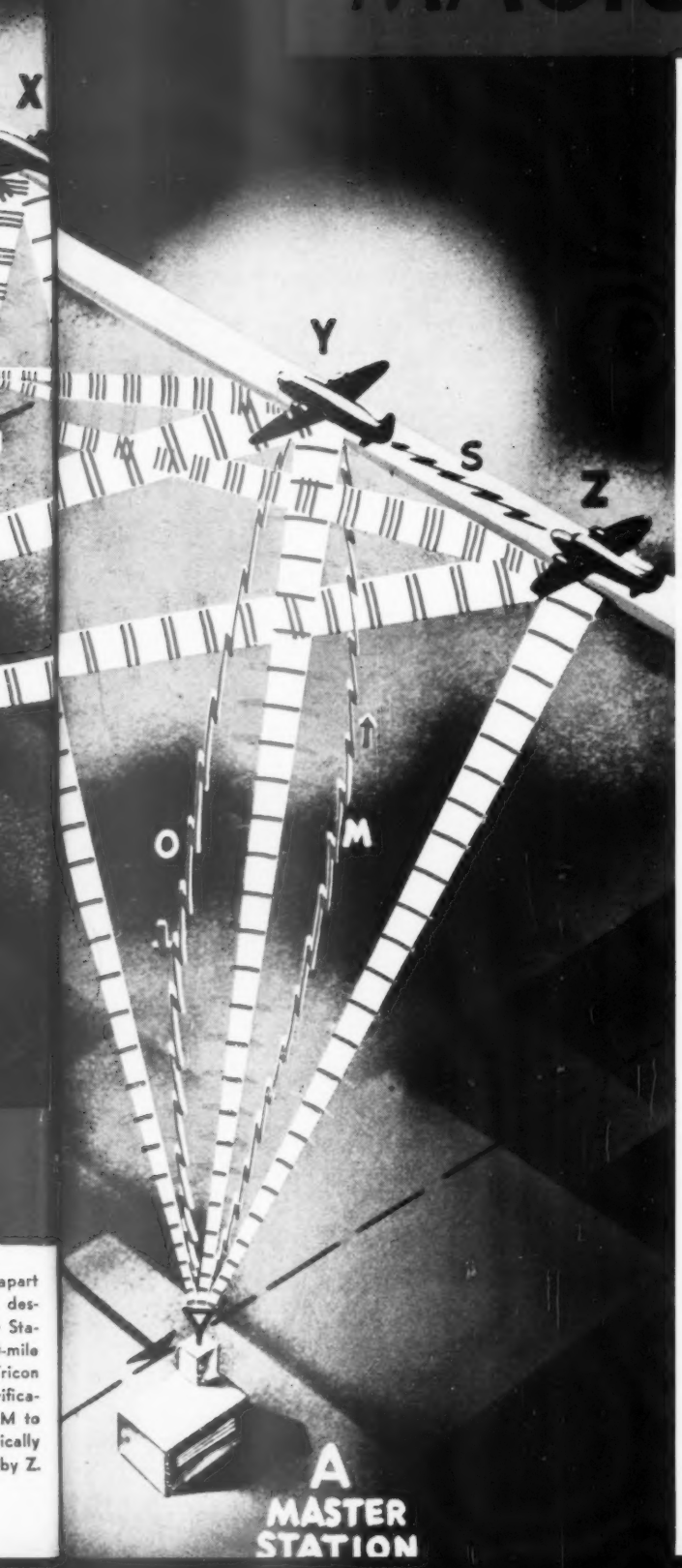
RADIO PULSES FROM STATION C

O IDENTIFICATION PULSE

M COMMAND PULSE

On Tricon airways, planes fly in airlanes two miles apart and vertically separated by 1,000 feet. The airlanes are designated and controlled by three ground stations, Master Station A and Slave Stations B and C which control a 50-mile sector. In this diagram, Plane X flies safely along Tricon airlane. Station A automatically receives plane identification code pulse O and sends out details of procedure M to plane Y. Plane Z is encroaching on Y, which automatically warns Z. This "block" signal warning S is received only by Z.

MAGIC AIRWAY



By GAITHER LITTRELL

West Coast Editor of FLYING

New electronic system can solve air traffic problem.

Dr. Luis Alvarez, inventor of GCA, proposed Tricon airways system.

ON AN airliner between Los Angeles and San Francisco a year ago, a young scientist whose name already is in aviation's Hall of Fame, was pondering this riddle: how can you communicate from the ground to one particular airplane in the air without the transmission being received by other aircraft?

Before the two-hour flight was completed he had found a solution.

Four days later he had worked out an additional system of air navigation and traffic control which promises to be the most accurate, safe, automatic and simple-to-fly system imaginable!

The scientist is Dr. Luis W. Alvarez, physicist at the Radiation Laboratory, University of California, and the inventor of one of the most revolutionary boons to aviation, ground controlled approach (GCA), which enables controllers on the ground to land planes by radar sight and radio command through fog and storm. His latest invention is to be known as *Tricon*.

Tricon, now under development by the Electronics Department of General Electric Company, will be able to do the seemingly impossible, such as:

1. Set up both straight and curved parallel "tracks" in the air at stepped-up altitudes, over which, if necessary, as many as 200 aircraft can be safely controlled over any one point in one minute's time while they speed along at 300 m.p.h. Traffic on tracks flowing in opposite directions is separated by an electronic barrier.

2. Despite traffic density, allow ground controllers to communicate exclusively with any individual plane, regardless of whether other aircraft are above, below, in front or behind the receiving plane. Such signals cannot be received by adjacent aircraft.

3. Equip ground command personnel with an automatic dispatch board from which can be quickly and easily read in three dimensions the positions and progression of all aircraft traveling the electronic tracks, besides giving the positive identification of each plane.

(*Continued on page* 74)

Watchdog IN THE Cockpit

DC-3 nose installation of terrain warning device is examined by Inventor Donald K. Allison (right).

With the help of radar, you may one day be able to fly with a "picture" of approaching terrain in your plane's cockpit.

Cockpit radar screen (top, center) developed by Allison is tilted 10° for better visibility. Dot indicating plane is low on screen, giving greater forward coverage.

WITH A NEW 58-pound radar set, you may one day be flying under instrument conditions with a "picture" in your cockpit of surrounding terrain, aircraft ahead and even nearby storm clouds. Right now the cost is prohibitive ($8,000 per set) but mass production and new money-saving developments may eventually put the radar scope, if not in your own lightplane, at least in executive-type aircraft. One new set is being given extensive tests by Southwest Airways, West Coast feeder airline.

Developed by Donald K. Allison, Los Angeles engineer and former staff member in the electronics research division of the National Defense Research Committee, the radar set is a modification of the military APS-10 unit used extensively during the war.

Tested on Southwest's fleet of DC-3s, the Allison radar is a complete tracking unit, the scanner covering a 180° arc, with the results of its searches pictured on a six-inch cathode ray tube scope in the cockpit. This viewing screen is tilted in the center of the instrument panel at a 10° angle to afford better vision and to eliminate the necessity of a glare shield between it and other instruments.

The equipment differs from the older Hughes radar warning device in that it gives a complete picture of the terrain and sky on optional ranges of 150, 50, 15 or five miles, whereas the Hughes device has no scope—only a warning bell and lights when obstacles are approached. The Allison unit also is unlike ordinary radar scopes in that its "center" point is set near the bottom rim of the scope, thus doubling the size of the image without a commensurate increase in scope size.

Airborne radar sets have scanners which send out radio pulses at the speed of light. When these beams strike an object they reflect back to the plane and are recorded in a "picture" on the screen. The scope indicates the terrain pattern in a manner comparable to a photographic negative: if a mountain, building or other obstacle is ahead it will show white on the scope, while the clear area is black.

American Airlines' R. W. Ayer, assistant director of flight engineering, and Capt. Sam Saint are given credit for developing the "pencil beam," an important constituent of airborne radar. By removing from the antenna a tiny strip of metal which reflects some beams downward, they created a "cone of silence" pictured on the scope as a black circle beginning at the zero range center. This is called the "safety circle" or sacred circle. By observing the radar scope, the pilot can see the (*Continued on page* 66)

How One Terrain Warning Indicator Works

Radar terrain warning unit, differing from that developed by Allison, has been tested by American Airlines. Series of photographs at right shows appearance of terrain on radar screen and from cockpit as an American air transport flies down a valley. Note that plane's location on this screen is in the center, giving all-around coverage. Arrows in top photo show how peak looks from window, and on the radar screen.

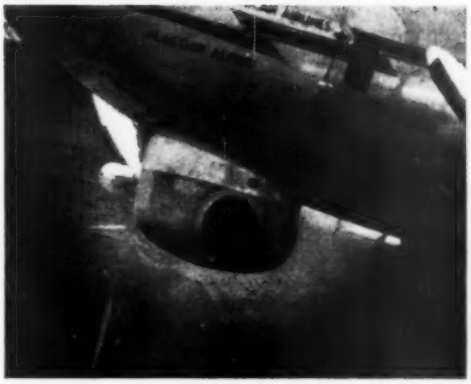
Safely past first peak, pilot sees white "pip" indicating a mountain is just off port bow. Arrows show appearance from window and on screen.

Plane nears peak. Note that pip gets closer to inner black circle, which represents plane. Reference circles indicate peak is one mile from plane.

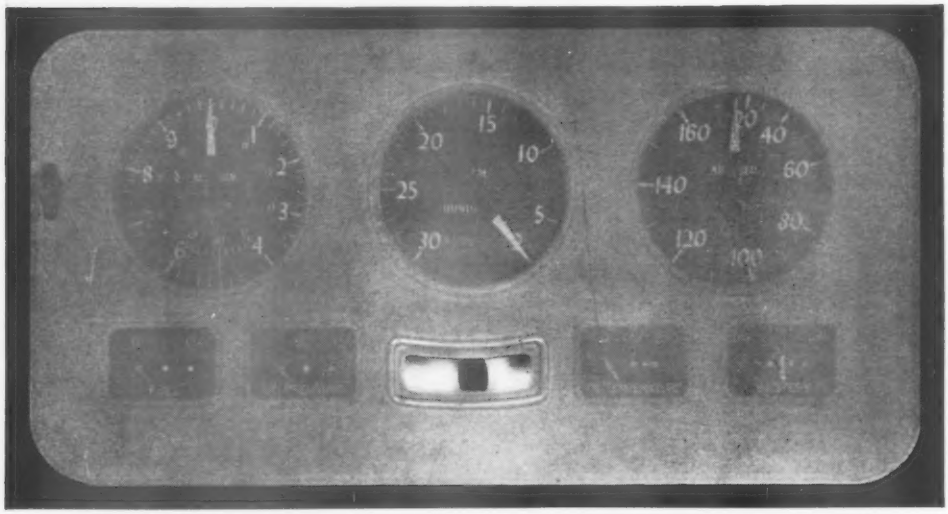
Pip gets closer. Screen's markings show that the peak ahead of plane is only half-mile away. Black area to left indicates "clear" terrain.

Crash in 15 seconds would have occurred had not the American Airlines pilot made steep 45° turn. Pictures were taken when set was tested.

Types of antenna housing developed experimentally by the American Airlines differ from that used on DC-3s of Southwest Airways. The American DC-4 (left) has a plastic nose that contains the antenna, and AA's Flagship Alpha (right), a DC-3, had a radome under nose.



USE A BANK INDICATOR



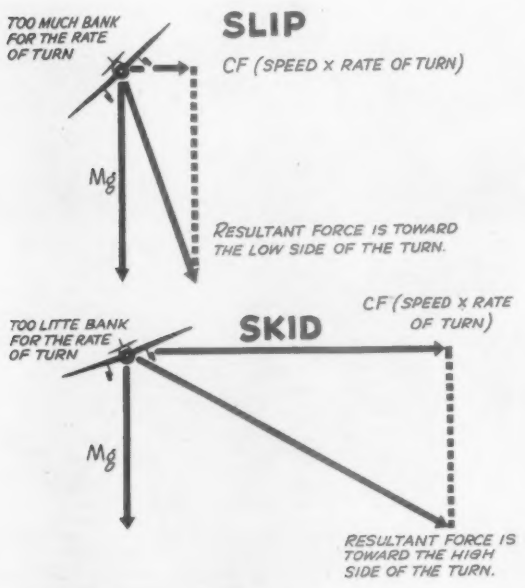
Ball-bank indicator can tell more about whether you are coordinating turns properly than any feeling you could possibly get in the seat of your pants, pilot advises. Indicator should be in every plane.

By JOHN R. HOYT

RECENTLY, during a flight test in a lightplane, an examiner told the applicant for pilot rating that he was skidding his turns. To the examiner's surprise the applicant flatly contradicted him!

"I'm not skidding," he insisted. "This is the way I always make my turns. *You're* the one who can't make a turn correctly!"

Who was right? Who may judge? If one experienced pilot says the turn is correct and another flyer says the turn is faulty, how can the matter be arbitrated to the satisfaction of all?


TOO MUCH BANK FOR THE RATE OF TURN
SLIP
CF (SPEED x RATE OF TURN)
Mg
RESULTANT FORCE IS TOWARD THE LOW SIDE OF THE TURN.
TOO LITTE BANK FOR THE RATE OF TURN
SKID
CF (SPEED x RATE OF TURN)
Mg
RESULTANT FORCE IS TOWARD THE HIGH SIDE OF THE TURN.

Flight mathematics illustrates what happens in poorly coordinated turns. Off-center ball in indicator would show trouble.

The answer, as many pilots know, may be obtained from the "bank indicator," better known among pilots as a "ball-bank indicator." Although it is by far the most valuable of all private pilot training instruments, the majority of lightplanes do not have one installed!

Perfecting oneself in flight maneuvers is impossible without some way of checking coordination. And despite the fact that this is an easy matter, too many pilots appear for flight test after hours of futile practice, not knowing that they have literally taught themselves to skid or slip during such a fundamental maneuver as the turn.

So it was with the applicant who criticized the examiner's flying. The latter wisely terminated the test, knowing the futility of argument, and recommended that the pilot obtain an inexpensive ball-bank, install it, and *check himself*. To the young man's surprise and discomfiture, he later found that he was making every right turn with a distinct slip.

Part of his trouble lay in the fallacy that to make a perfect turn we apply simultaneous stick and rudder pressure, establish the turn, and then "neutralize" the controls. This is all very fine for a beginner who has not developed any feel of the plane. It may even work satisfactorily if the pilot happens to be flying a perfectly-rigged ship at cruising throttle.

But what happens when this technique is used in a plane improperly rigged? Or what is the result if we apply full-rated horsepower available at our altitude? Almost instantly the picture changes: if we fly level, the airspeed increases and we must use *left* rudder to compensate for the *increased* moment from the offset vertical fin; or, if we climb, our airspeed diminishes and we must use *right* rudder to compensate for the reduced moment from the offset vertical fin.

Failure to use rudder properly in a turn means poor coordination. Coordination is (*Continued on page* 71)

They're giving away airports in Washington. Here's how a Missouri town acquired one.

Ex-Army airport was given to Cape Girardeau, Mo., as municipal field. Navy rents one of four hangars, pays city $3,600 annually.

Want a Free Airport?

By CHARLES L. BLACK

Associate Editor of FLYING

CAPE GIRARDEAU, MO.—a Mississippi River port with 19,426 inhabitants—has a bustling half-million dollar municipal airport this year. And it didn't cost the city's taxpayers a cent.

All over the United States, millions of dollars worth of airports "for free" are popping up. Regardless of location, they have one thing in common. They are ex-Army or Navy fields, turned over without cost to municipalities and counties through the War Assets Administration's surplus property division.

Latest WAA figures show that 490 fields have already been turned over to local governments. These had a war-time value on WAA books of $866,000,000. Some 280 more, with a book value of $733,000,000, are still available.

Of course, many of them are too large to be used profitably for municipal ports. But others (if taken in hand by energetic municipal groups) can be converted into ideal, and well-equipped, community airports.

Cities located near ex-Army and Navy airports can acquire them without cost, provided the fields are declared surplus, waivers can be obtained from other Governmental groups, and the CAA approves use of the field for a civil airport.

Fairly typical example of the way cities and counties have taken over these fields and turned them into profitable operations is the case of the Cape Girardeau municipal port. Before the war, Cape Girardeau wasn't particularly air-minded. It had a little field run by local interests. The outfit—Consolidated School of Aviation—owned enough acreage to provide two 2,600-foot sod runways. But in those pre-war days, airplanes were more of an oddity than a commonplace in the southern Missouri town.

Then in 1942, Defense Plant Corporation began con-

Airport open house, celebrating gift of the half-million-dollar field to city, attracted hundreds of Southeast Missouri aviation enthusiasts.

Publicity head for Cape Airport Board is 29-year-old Rush Limbaugh, Jr., ex-Army flyer, who reads about success of air promotion campaigns.

struction of a primary flying school at Cape Girardeau. They bought 58.7 acres of land, constructed four hangars, office buildings, a flight control building, a tower and barracks buildings. The Government leased an additional 640 acres. During the war, two large parking ramps (900 x 300 feet and 1,600 x 200 feet) were built. Two 50-foot bituminous runways were run out to the prevailing winds runway which is 2,000 feet long and 100 feet wide.

Came war's end and curtailment of Army Air Forces flight training. The Army airport, Harris Field, was closed. Consolidated School of Aviation, which had plugged along during the war, was slowed almost to a standstill. Meanwhile, right on the outskirts of the city was the modern military airport with every facility required for a municipal field. It was being used only as a storage lot for surplus Government aircraft.

Just about that time, citizens in Cape Girardeau decided to take matters into their own hands. Mayor Ray E. Beckman appointed a five-man airport board for the city, instructing them to "go get Harris Field." Under Governmental regulations, Federal agencies have first call on the surplus ports, followed by state governments and finally local governments. The Cape Girardeau Municipal Airport Board obtained waivers from the Federal Government, the state government and adjoining counties and cities, leaving them with the top priority to acquire the land and buildings owned by the U.S.

Plans went along smoothly. Then the CAA posed an unexpected problem. After surveying the field, it recommended that the city should have a Class III airport. That meant that, in addition to the 58.7 acres (plus all installations) which would be given gratis to the city, an additional 260 acres *plus* improvements to the property would have to be assured before the airport could be transferred to the city.

Air-minded citizens, pointing (*Continued on page* 84)

New municipal field has 2,000-foot runway. City passed bond issue to build 2,000-foot extension, 4,000-foot sod runway and to buy more land.

Pumping dihedral into a wing, Inventor Metzler stands before his modified Aeronca, showing wings in two positions: above with normal two-degree dihedral, below with 10° dihedral after struts have been extended. Increased dihedral adds stability in flight.

Wing with a Slant

By FRED HAMLIN
Eastern Editor of FLYING

Simple cockpit gadget changes wing's dihedral during flight.

AFTER EARL METZLER, 36-year-old Latrobe, Pa., toolmaker, learned to fly he began to study aerodynamics. And from these three interests he has created a new device for personal planes that may result in smoother, safer flights for all.

Aerodynamics taught Metzler that the more dihedral, the smoother the flight. This is the principle behind a dihedral device which he has installed on his Aeronca, a converted liaison plane. At the same time, he realizes that the less dihedral, the less difficulty in landings. His device therefore provides for the regular 2° dihedral on the Aeronca on landings and take-offs and a 10° dihedral in level flight.

To accomplish this, he has anchored the conventional Aeronca struts on an extension device where they attach to the fuselage. Unextended, the device gives the struts normal length and holds the dihedral at normal. Extended about four inches it pushes the wings up to a 10° dihedral. Extension and retraction of the struts is done from the cockpit, where Metzler has a small hydraulic pump installed between the front rudder ped- (*Continued on page* 83)

Hand pump in cockpit changes dihedral. Finger points to valve which sets wing angle.

Strut extension fits into hydraulic cylinder, where it is actuated by cockpit pump.

This is Private Flying

FOURTH OF A SERIES

By GEORGE E. ANDERSON

"THERE'S nothing wrong with private flying that some good business methods couldn't cure."

That sentence sums up my impression after flying a new Luscombe 8E through 12 western states. I flew 4,324 miles on this leg of FLYING's survey, stopping at 48 airports and getting maintenance work done at 23.

When this project was first conceived, we assumed we would be dealing largely with unscrupulous airport operators and mechanics. We had obtained that impression from letters from our readers, from AOPA reports, and from other reliable sources. After a number of conferences with AOPA and FLYING officials in Washington, it was agreed that I would tour the country in complete secrecy. So far as anyone knew, I was using my personal plane in my father's contracting business; I gave my address as Irons, Mich., my father's home.

As already pointed out in previous articles in this series, the airplane was in as near perfect condition as possible before I headed west from the Luscombe factory in Dallas. Nevertheless, what happened to me from the moment I took off from Dallas makes me wonder that there are as many plane owners and pilots flying as there are. At each of 23 airports I either loosened a spark plug wire, crossed one or more of them, pulled out the primer with the engine running, bent a trim tab—all minor things if the mechanic in each case had been competent or familiar with the average lightplane. But what the average fumbling mechanic actually did to my little craft made me thank my lucky stars that plane and engine were as rugged and safe as they are.

I will say this in favor of those sloppy mechanics: they stuck with the "problem" until they got the Luscombe back in flyable condition. But they did more to make the plane unflyable than I ever could—and I paid for needless repairs time after time. Despite the fact that I was overcharged any number of times, it was due to the carelessness, negligence and inefficiency of the airport operators and mechanics—not, as we first suspected, because they were dishonest.

Last month I described my repair-hunting expedition from Dallas to as far west as Los Angeles. At Los Angeles I was prepared for anything. The majority of complaints FLYING and AOPA receive come from that busy, overcrowded area. Some fantastic cases had been reported to us in recent months—like the Los Angeles operator who is reported to have charged the private owner of a DC-3 $1,000 to wash that airplane. Or the movie-star-pilot who paid out the price of a new airplane trying to keep his newly-rebuilt twin-engined Cessna from falling apart on a cross-country trip—after paying a Los Angeles operator a healthy price for rebuilding the airplane in the first place.

So I went into the Los Angeles area with apprehensions, a fairly fat pocketbook, and one hand ready to phone FLYING's Chicago offices for more money. First airport in the Los Angeles area at which I made an "emergency" stop was at Santa Ana. After landing, I taxied up to the hangar and opened the primer as I neared the ramp. The engine loaded up almost immediately and started to miss

The author has been a pilot since 1940, an A&E since 1941. Because of his experience in checking "gripe" airports for AOPA, he was asked to make the survey on which these articles are based. During the war, Anderson worked on WTS and CPT programs, later was an engineer on B-29 engine nacelles and control surfaces. He is now maintenance director for an eastern aviation firm.

Slipshod business methods cost airport operators trade and money, Anderson learns.

badly. Black smoke began pouring out of the exhaust stacks. No one came out to direct me to a parking place so I finally had to park it myself and cut the engine. I got out and looked under the cowl, watching the raw gasoline drip from the carburetor drain. Still no one came out. Meanwhile, a photographer FLYING assigned to cover me in the Los Angeles area, and whom I picked up at Bellflower airport southeast of the city, got out and took my picture while I waited for some field attendant to come out and offer me service.

Finally, I saw a mechanic drive (*Continued on page* 48)

Checking quality of repair work in the Los Angeles area, Author Anderson (in cap) inspects his Luscombe at Santa Ana airport (above). Mechanic here was one of few who spotted his open primer before tinkering with carburetor mixture. At East Los Angeles airport (left) he got a 100-hour engine inspection on which he felt the mechanic did an excellent job.

Legend:
AIRPORTS CITIES
SEAPLANE BASES
RIVERS RAILROADS
FLYING MAP — HAL MORRIS

A FLYING Holiday

Georgia Sea Islands

Pilots will find an early spring along the island-dotted coast of Georgia

ON THE AMBER 7 airway between Savannah, Ga., and Jacksonville, Fla., lies Georgia's Sea Island playground, known in history as "The Golden Isles of Guale." The hundred-mile coast of Georgia is rimmed with islands—Cumberland, Jekyll, St. Simons, Sapelo, St. Catherines, Ossabaw and Tybee islands plus innumerable smaller ones. All save St. Simons and Tybee are privately owned and closed to the public. However, these two have many attractions ranging from surf casting to luxury resorts.

Of the group, St. Simons is most interesting from both the historical and recreational points of view. In its nearly 400 years of occupation by white men the flags of Spain, France, England, the Confederacy and the United States have flown over it. As early as 1575 French settlers were exporting its produce to the home country. Later the Spanish drove them out and held the island for decades. The Franciscan Mission of San Buenaventura flourished so well that, when English settlers under General Oglethorpe went there in 1733, they found orange and olive groves still growing.

Oglethorpe, founder and first governor of Georgia, established his colony ostensibly to provide a debtor's haven but actually to set up a buffer state between English Carolina and Spanish Florida. He erected Fort Frederica, at that time the largest English fortification in the United States. The fort is still standing, has been made a National Monument, and now is a (*Continued on page 58*)

Flyers on coast of St. Simons island tie down their planes, and prepare tackle. They wait for tide to bring the sea bass and sporting fish that abound along the Georgian coastline.

Golfers on Sea Island have an 18-hole course and a plantation-style clubhouse built over 100 years ago.

Fishing from piers and boats is excellent. Pilots can walk a few blocks from McKinnon Airport to this wharf.

McKinnon Airport on St. Simons is located conveniently near tourist accommodations, main recreation areas. Longest runway is asphalt, 4,100-feet. Nearest town (one mile) is Sea Island.

Ryan Navion retains basic features of old model, but has numerous refinements.

THE *Ryan Navion*

FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Approved Type Certificate are flown. The author is not a professional test pilot. He evaluates each aircraft through the eyes of an average private pilot who flies an airplane either for business or sport.

EVERYONE INTERESTED in private flying has been waiting to see what Ryan has done to the *Navion*, particularly in view of the fact that Ryan felt it necessary to boost the price $1,000 to $8,750. I have just landed after having flown the first Ryan-built *Navion* that will go into the Chicago area. I am writing this at the Ryan plant at San Diego. Tomorrow I will take off for Chicago in this ship, after having flown out to San Diego with Rex Howard, Chicago-area distributor, in an old *Navion*.

I was particularly fortunate in being able to fly the old and new *Navions*, each within a few hours of each other, and each for a considerable time. My reaction was immediate: the Ryan job, to all practical purposes, is a new model. It's the same basic airplane, all right, and it's put together from the supply of parts Ryan got from North American when they bought the *Navion* program. But from that point on it's a new airplane. Ryan has done (*Continued on page* 72)

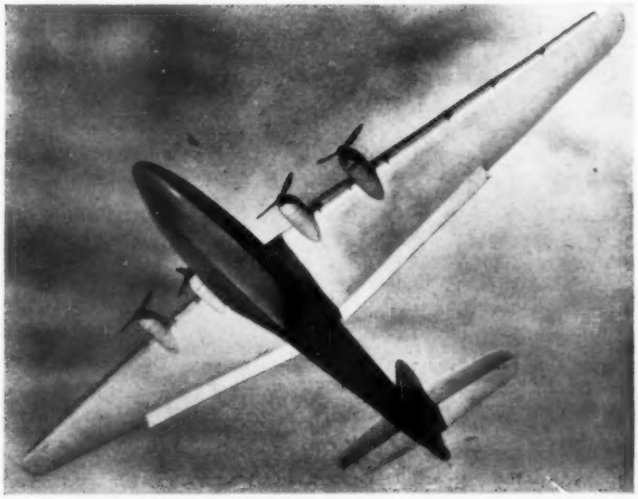
Mechanical improvements in new Navion include sound-proofing and a redesigned ventilation system, fuel system and tanks.

Chase Avitruck (XCG-18A) is all-metal assault glider designed for Air Force. Projected modification would give it two engines, otherwise follow its basic design.

HAVE YOU SEEN?

Bearcat Link Trainer helps solve navigation problems at Naval Air Station, Jacksonville.

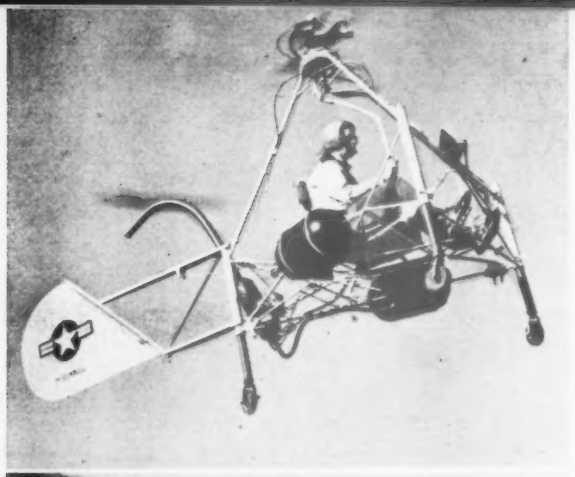
Narco transmitter attachment weighs 11 ounces, gives six VHF channels or the standard 3105 kc.



Powered research model flying boat has NACA planing-tail hull. Slots won't be on final full-size plane, but correct for scale effect.

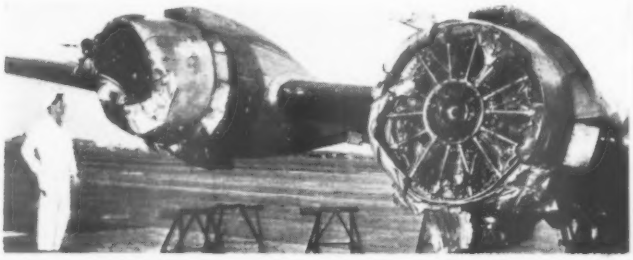
HAVE YOU SEEN?

continued



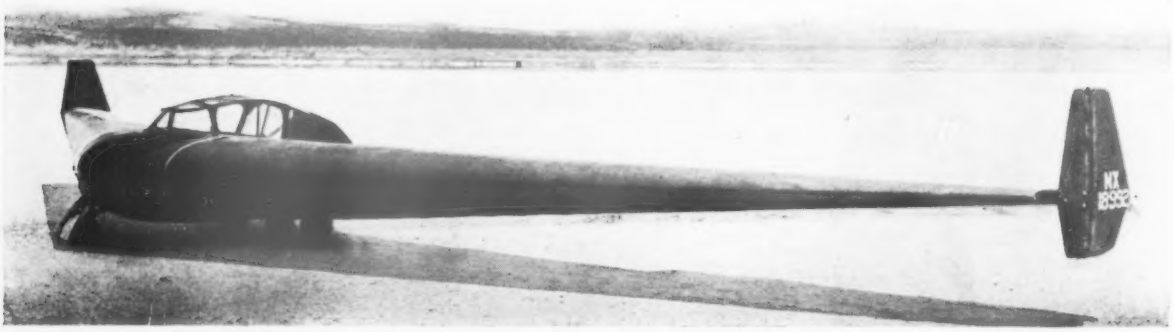
New helicopters are (top to bottom) McDonnell ram jet helicopter, Hiller 360, and Helicopter Engineering Research Corporation's JOV-3. First ram jet 'copter in world, McDonnell design has two 10-pound engines on rotor tips, weighs only 310 pounds in all. Hiller 360 has simplified control system, and is claimed to be "fundamentally stable." It will go into production soon. JOV-3 has two tandem rotors 19 ft. in diameter.

New Italian four-place plane is the Sai-Ambrosini S. 1001. Plane has fixed landing gear, maximum speed of nearly 150 m.p.h., landing speed of approximately 55 m.p.h., cruises at approximately 130 m.p.h.



Close call was had by crew of United Air Lines all-cargo DC-4 when plane brushed hill in Hollywood area, damaged engines and lost two props early in December. Craft landed safely at Los Angeles Airport.

Avro Tudor VII is new British transport seating 60 passengers. It is powered with Bristol Hercules radial engines instead of liquid-cooled Rolls-Royce Merlins, as was earlier Tudor II. Cabin has lounge, bar.

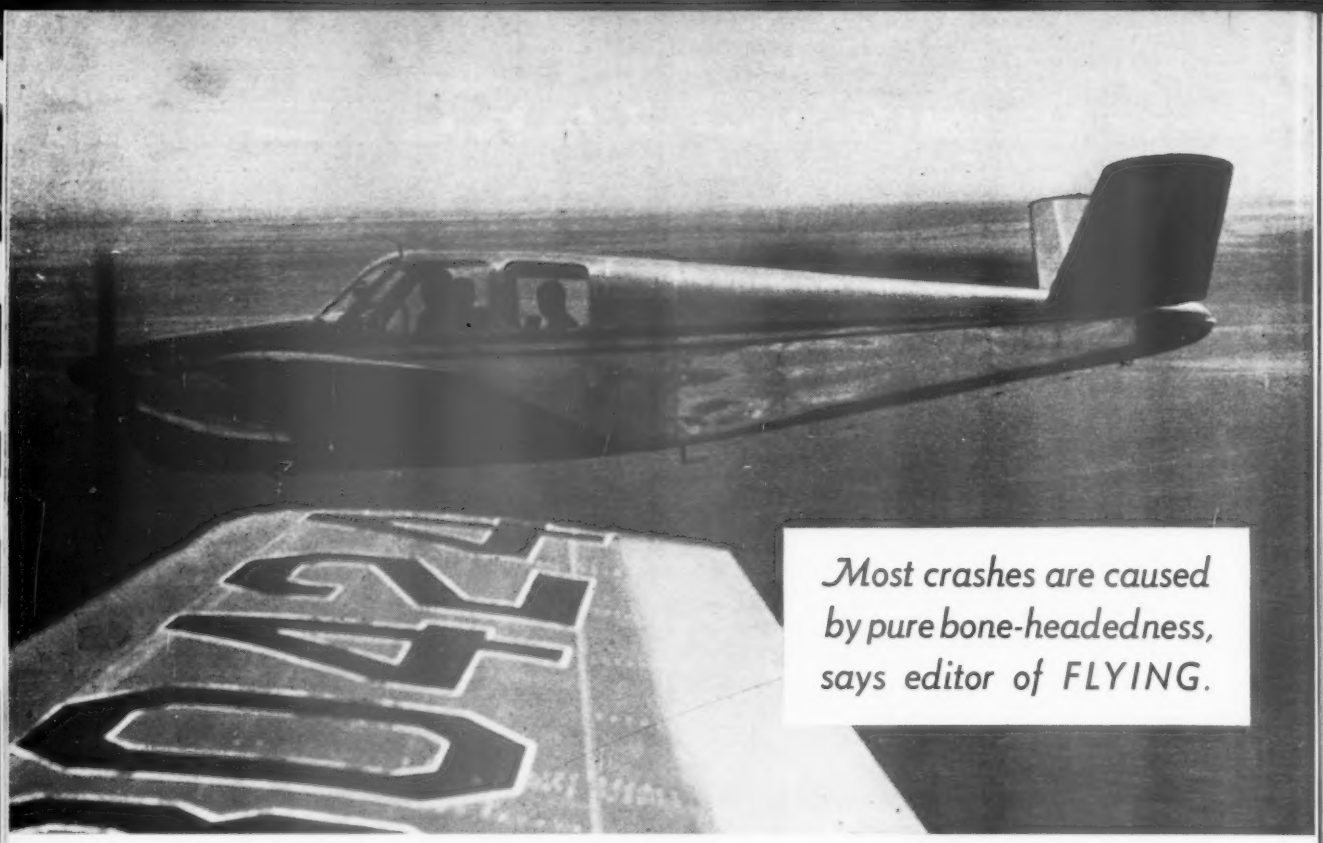


Flying wing glider is Mitchell Superwing, two-place side-by-side craft with 50-foot span. Glider has been tested extensively and now has engine attached to make it powered plane, cruising at 79 m.p.h., landing at 28 m.p.h. As glider it has glide ratio of 35:1.

Roller weighing 400,000 pounds is used to compact airport subgrade at Baltimore. Built by Goodyear, roller is ballasted with eighty-pound iron ingots.

Grumman Panther (XF9F-2) is new Navy carrier-based fighter, with low landing speed, 600-plus m.p.h. top speed. It's powered by British-designed Nene jet.

Grumman Albatross can carry 14 passengers, is rough water craft especially designed for open sea rescue work. It may also be used as a trainer, and for personnel and cargo transport. Plane can get off water in 12 seconds with Jato, cruises at 225 m.p.h.



Editor and Bonanza in which he made his first, unplanned, night landing. Passengers were two radio men who had to get to Miami.

I Learned About Flying From That! NO. 100

By

MAX KARANT

Editor of FLYING

IT HAS been said that you can only make one mistake flying an airplane. Your first is supposed to be your last.

Which is a lot of malarkey. For proof you needn't look any further than FLYING. This article is No. 100 in the series "I Learned About Flying From That"—a series, incidentally, that recently was voted the most popular regular feature in FLYING by several thousand readers.

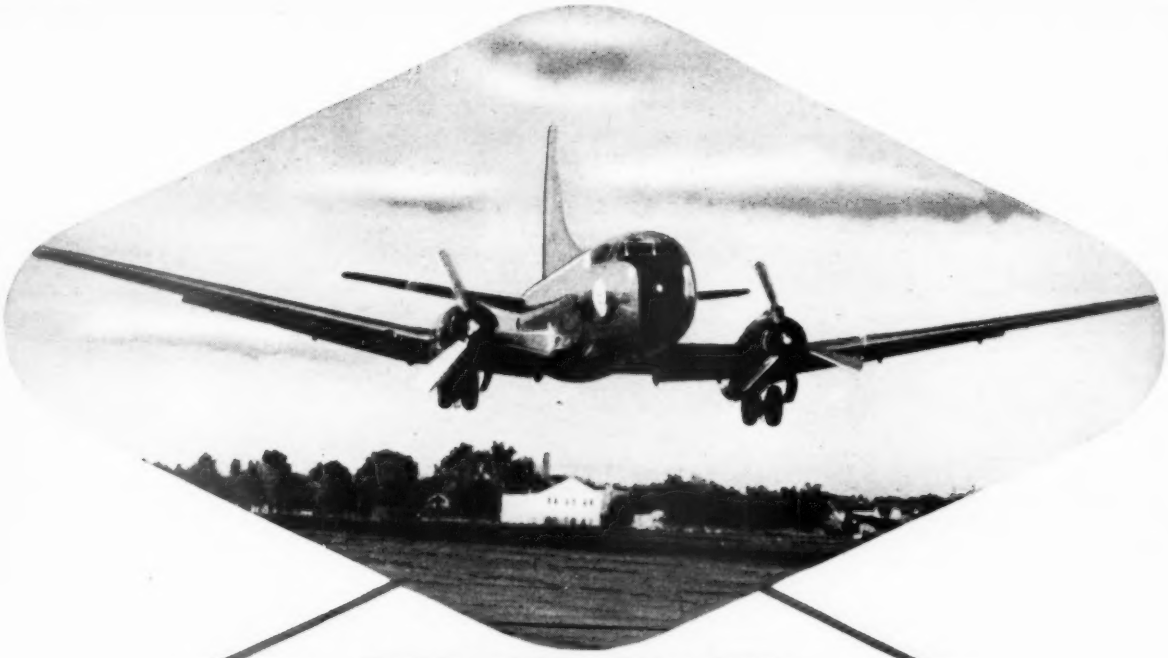
"I Learned About Flying From That" is proof positive that every pilot, amateur and expert, can and has made dangerous mistakes in the air and lived to tell about them.

Sometimes the event was the result of an unavoidable accident, sometimes it was due to carelessness by someone other than the pilot. But the overwhelming majority of these incidents reflect pure bone-headedness on the part of the pilot himself—a fact, incidentally, that has overwhelming proof in Government accident statistics, and in aviation insurance records.

That means that, whenever you fly, *you* are the guy you should fear most. You rarely will get into trouble because of some intricacy peculiar only to aviation. Almost always it will be for the same basic reasons you get in trouble on the highways: carelessness.

The late Tex Rankin and I "thought up" this series of articles 8½ years ago. It was our belief that the average pilot could and would profit from the mistakes of his fellow pilots. That theory proved so well-founded that we have literally been swamped with contributions to the series ever since the first article appeared. It would be a safe guess that we have received at least 10 such articles for every one we have printed.

In other words, there is not (*Continued on page* 50)



ANOTHER REASON

Why More Aircraft Land On Goodyear Tires

Goodyear research and development consistently anticipate the rapidly changing requirements of the aircraft industry with pace-setting improvements in all Goodyear products. Over the years, Goodyear has made many improvements and innovations in the construction of aircraft tires. The result — the rated load capacity has, in some cases, been increased considerably with only an insignificant increase in actual tire weight. For complete information about Goodyear's improved aircraft tires or any other Goodyear aviation products, write to: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

GOODYEAR
AVIATION
PRODUCTS

1898 GOODYEAR 50 GOLDEN ANNIVERSARY 1948

Goodyear aviation tire being subjected to test on giant dynamometer.

MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun." Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING. news-letters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

HUNDREDS of letters are pouring into AOPA Headquarters following publication of *An Open Letter to Pilots* by J. B. Hartranft, Jr., AOPA general manager (AOPA NEWS, *January* issue).

Asking for the immediate support of every qualified non-scheduled pilot, Hartranft said private flying was threatened with a 40 per cent curtailment unless pilots rallied to defeat Government and industry interests working against personal aviation.

Pilots from every state, who answered Hartranft's letter, gave the Association complete authority to represent their interests in Government, industry and Congressional hearings and meetings. Many, who wrote lengthy letters, discussed AOPA's stand on the Air Traffic Rules (Part 60) which were recently argued before the Civil Aeronautics Board. Others spoke of private aviation's future—if it is given a chance to survive Government red tape. All promised their support of AOPA's program to make flying more useful, less expensive, safer and more fun.

The following is a representative group of letters received from these pilots:

"With experience of 3,000 hours flying time (and at least 1,000 hours cross country) it appears that mandatory filing of flight plans and increasing visibility requirements from three to five miles is not only a squeeze, but without logic and sound reasoning. If such would apply to a student's first solo cross-country flight, or even the holder of a Student Certificate with limited experience, it might be classed as a law which governs correct thinking. I believe a pilot with a private or commercial certificate should be allowed some consideration, and given credit for his own analytical ability. . . ." *James F. Wedeking*, Evansville, Ind.

"It would certainly be a nuisance, if not an impossibility, to file a flight plan for every hop, skip and jump taken in my *Cub*, particularly since I keep it on a farm. . . ." *Marie Miller*, Shreve, O.

"There are enough pitfalls (regulations, taxes and exorbitant fees) in private flying today without other hurdles being thrown in the private pilot's path. I sincerely hope all who read your editorial will rally to the cause. . . ." *T/Sgt. Kinne D. Prachel*, Birmingham, Ala.

"Here's my proxy to fight anything that hinders private flying. . . ." *Glen Wiley*, Gorin, Mo.

"It both disgusted and angered me to find the more powerful aviation interests are trying to hold the little fellow down. . . ." *Gordon Homdrom*, Ambrose, N. Dak.

Pilots and aircraft owners who missed the January AOPA NEWS may obtain copies from AOPA National Headquarters, 15th and New York Avenue, N. W., Washington 5, D. C.

INJUNCTION CASES

Airports, long badgered by nuisance suits, received a shot in the arm last month when an Ohio Court of Appeals reversed a lower court decision and ruled that airplanes making landings and take-offs have a right to fly lower than 500 feet over private property adjoining airports. The lower court had previously granted an injunction to nearby property owners (led by Russell Firestone) against an airport on complaints of nuisance and property depreciation.

J. M. W. Chamberlain, airport owner, immediately notified AOPA of the favorable decision and thanked the Association for its help.

Operators faced with injunction cases may obtain AOPA assistance and copies of comparative sound tests made by CAA at AOPA's request, showing actual comparison of personal aircraft noises with other noises common in the vicinity of an average residential district.

LIGHTPLANE ACCIDENTS

CAB reports pilot error caused 3,870 (or 64.5 per cent) of 1947's first 6,000 lightplane accidents. Other leading accident causes listed by CAB were weather (664), powerplant failure (515), and terrain (488).

Landing-take-off-taxiing accidents led numerically with 2,474. Only nine were fatal, however, and 32 serious. Collisions with other objects followed closely with 2,110 accidents—201 fatal and 158 serious. Stall-spins, although third in number with 865, accounted for 295 fatal accidents. Combined, the last two categories resulted in 496 or 85.2 per cent of the 582 fatal accidents.

Of the 9,508 persons involved in the first 6,000 accidents analyzed, 898 (9.5 per cent) received fatal and 527 (5.5 per cent) serious injuries.

See table at the bottom of this page.

RECOMMENDED READING

Two new booklets recently added to AOPA's recommended reading list are *Terrain Flying* and *Facts of Flight*. Released by the CAA, the publications may be obtained from AOPA or the U. S. Government Printing Office, Washington 25, D. C.

Terrain Flying (price, 25 cents), an 80-page, pocket-size booklet, describes special problems and hazards encountered in flying through various parts of the U. S. There are pages describing the difficulties presented to the pilot by smog, the smoke and fog mixture that bedevils the air about Pittsburgh and Los Angeles; the haze that wipes out the horizon over the Alleghenies; the downdrafts that inhabit the precipitous sides of the Rockies; the "frozen wastes" in North Dakota, Montana and Minnesota; the blistering sun of the southwestern deserts; and special problems, political and physical, of Mexican flying. Each chapter is packed with advice of veteran pilots who have flown in each of these areas long enough to qualify as experts in these special conditions.

Facts of Flight, by George Sidney Stanton, Chief of the Examination Section of CAA's Office of Safety Regulation, sells for 50 cents, is illustrated in color and written in non-technical language for the beginner pilot. It has chapters on airplane flights, stalls, spins, structure, engines, flying the plane, airport traffic, seaplanes and safety in flight, and is crammed with practical data and tips on such subjects as carburetor icing, safe starting of the engine, landing techniques, radio communication and acrobatics. The appendix includes a useful table showing take-off distance and rate of climb under various conditions of wing loading, power loading, temperature and altitude. END

Breakdown of First 6,000 Accidents—1947

Type Accident	Total	Fatal	Primary Cause	Total	Fatal
Landing, Take-off, Taxiing	2474	9	Pilot Failure	3870	494
Collision—Two Aircraft	180	24	Other Personnel	115	15
Collision Objects	2110	201	Powerplant Failure	515	13
Stall-Spin	865	295	Airframe Failure	289	14
Material Failure	276	26	Weather	664	25
Fire	21	3	Terrain	488	3
Propeller Accidents to Persons	26	7	Miscellaneous	37	6
Misc. and Undetermined	48	17	Undetermined	22	12
Total	6000	582	Total	6000	582

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Other new military and commercial aircraft have recently taken to the skies. Many more are "on the boards" and being developed and produced. Right now there are *more aircraft and power plant engineering projects under way, and scheduled for the future, than ever before.*

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This Is Private Flying

(*Continued from page 37*)

up in a truck so I went over to the other side of the hangar and asked him if he'd come out and look at my plane. He said he couldn't do anything without a work order, so the two of us set out to find his boss. We found him upstairs on the other side of the hangar, picked up a work order, and all three of us went out to the plane. At the mechanic's request I started the engine, though I left the primer open. As the engine sputtered he reached across and tried the throttle a few times. Then he noticed the open primer, pushed it in, listened to the engine a moment, and said that that was the trouble. I then asked for the bill. The boss said there was no charge, that he was glad it was nothing more serious and hoped I'd come back again. This was one of the two or three times that the opened primer was found by a mechanic before he started tinkering with the carburetor mixture.

Next stop was Grand Central Air Terminal. After landing, I stopped and disconnected a plug wire, then taxied down to a hangar marked "Customer Service" at the other end of the field. I taxied right up to the hangar, though no one was there to direct me. Meanwhile the photographer got out and walked away from the plane so as not to arouse suspicion. I cut the engine, got out myself, and just then a jeep pulled up. I told the driver what I wanted and he suggested I go into the hangar, ask one of the mechanics to help me. I found one, he went out to the ship, started it and ran it up, checking the magnetos. He then stopped the engine, got out, opened the cowl, and quickly found the loose wire. Again, no charge.

One important point should be remembered, however. At no airport was I able to spend enough time to get some *major* maintenance work done. Most complaints of gouging apply to charges for major maintenance work, not just casual service to transients.

Next stop was Whiteman Airpark, north of Los Angeles. As we taxied up to the gas pit I opened the primer, making the engine miss again. There was a man at the gas pit where I stopped, so I cut the engine, told him to fill the tanks, and asked him to get a mechanic to check the idling. He spoke to a mechanic off to one side while the photographer and I walked away. I watched my plane for 25 minutes, and no one went near it to check anything. I finally went back and asked what had been done. He said the mechanics had all gone home and that they couldn't do anything for me until the next day. So the photographer and I got back into the plane and I closed the primer and took off for Rosemead, another Los Angeles airport, where we tied down for the night.

Next day we flew over to East Los Angeles. There I asked for a 100-hour inspection on the engine, an oil-change, a 25-hour inspection on the plane, and a wash job on the entire plane. While I watched, a mechanic did a good job on the 100-hour check. By this time the weather had gone bad, so we went back into Los Angeles. But next day I found that he had not washed down the engine (normal procedure with a 100-hour check), had not cleaned the cowl and oil drainings had run clear back under the belly of the ship. In addition, they had not washed the airplane.

Before closing the cowl after checking these points, I crossed all four top plug wires, cutting out the right magneto completely. I took off that way and flew over to Vail Field. There I found they had only one mechanic on duty (it was Sunday), though they have a well-equipped shop. I had to wait nearly an hour for the mechanic to finish with another job and have his lunch. Then he started on my ship, first inspecting the switch wires and points. His next move was to check the plugs on Nos. 1 and 3 cylinders. So, without thinking, he carefully removed the crossed wires and laid them so they stayed in the crossed position while he checked the plugs (which were clean and in good condition). He saw they were all right, so he replaced them—and carefully replaced the wires in their crossed position.

He ran up the engine again, found the mag was still out, so he then removed the mag itself. It checked out perfectly on the test stand, so he replaced it. This sort of thing went on for nearly *two days*. While I didn't stay to watch all the work done on my ship, I did see most of it—and that was plenty. They took the mag apart twice that I saw, and twice more that they told me about. During these efforts they broke a rotor clip in the mag and had to send an airplane to Glendale to get a new clip. They told me the internal timing of the mag was off, but that the ship would be ready shortly after noon (Monday). So I went out to the field after lunch, found the job was far from finished and that they were in the process of locating a third clip, having broken the second one as well.

I finally got out of Vail Field at about noon Tuesday. Somewhere along the line they had discovered two of the four crossed plug wires. Evidently someone had accidentally uncrossed the other two, thereby inadvertently correcting the trouble. The bill was $30.56, and included 7.2 hours of labor at $3 per hour. It also included one set of ignition points for which I was charged $7.50. In Chicago I priced these points at two supply houses. Both quoted a price of $2.10 for a set. I also was charged $1.25 for one rotor clip; the quoted price in Chicago is 10 cents for the same clip.

Fresno was next. I stopped there overnight, so I asked the operator to wash the plane. Next morning I found the plane had been washed but not wiped, and was thoroughly streaked. This was the first time I'd asked for a wash job and got it. I was charged $5. I then flew up to Stockton, where I asked them to check the idling and correct it for wing-heaviness. This took 18 minutes by my watch. I was charged $2—which works out to a rate of $6.65 per hour. The wing-heaviness was "cured" by bending one of the fixed tabs. Result was that, by the time I got to Redding, Calif., where I stopped for gas, my arm was nearly paralyzed from holding the stick against that tab. At Redding I bent the tab back myself.

Flying up to Medford, Ore., I went to 11,500 feet to get over the mountains. While up there it got so cold that the right window cracked. At Medford a mechanic drilled a small hole at the top of the crack and checked the idling at my request. The bill was reasonable: $1.50.

At Eugene I landed at the field used by the airlines but found they had no gasoline or maintenance service. While on the ground there I removed the left spring from the steerable tail wheel. Then I flew over to the Eugene Airpark, where I got a mechanic. I told him the plane flew all right but veered to the right on the ground. He spotted and replaced the missing spring right away—but with a weak spring. He then removed the right wheel, cleaned and adjusted the brake and repacked the bearings. I then

15 YEARS AGO

FROM the March, 1933, issue of this magazine:

The Consolidated *Fleetster* was a new parasol-winged monoplane transport used by TWA for passengers, mail and express. It carried seven passengers, had a cruising speed of 145 m.p.h. and a range of 750 miles.

An article by Carl B. Ogilvie, entitled "Training Errors of the A.E.F.," disclosed how poor training planes, inadequate equipment and incompetent officers caused needless loss of life in the advanced training camps of the A.E.F. Material was gathered from a diary kept by a young cadet.

A new clipper plane, the Sikorsky S-42, was designed for Pan American Airways under specifications proposed by Col. Charles A. Lindbergh. The four-engined plane carried 50 passengers and mail and freight.

Background data on filming the movie "Air Mail" was given in the article "How a Thrilling Air Movie is Filmed." Veteran Flyers Paul Mantz and Jimmie James did most of the flying for the stars. Although many camouflages, such as electric-fan-propelled blizzards, cornflake snow, etc., were used, much real flying had to be done.

A "bullet-proof" warplane was invented by A. K. Longren. The armor consisted of duralumin plates riveted together. The inventor claimed that because of the shape of the plates bullets were deflected without causing any damage.

The Heron HE-57 amphibian combined American and German engineering. It was built in Germany with American materials and equipment. The craft was a six-place amphibian powered with a 425-h.p. Pratt & Whitney *Wasp* engine mounted above the hull.

Chrysler Corp. made an agreement with Western Air Express to deliver automobile parts by air.

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told him my ailerons were not properly aligned. I asked him for an estimate of how much it would cost to adjust them and he told me "between $7 and $8." I told him to go ahead. He did a good job and charged me $6.65—which included the work on the brake and tail wheel.

At Tacoma my plane got its first 100-hour inspection. As soon as I landed and had the ship gassed, I asked for an estimate on that maintenance job. I was shown the bills on two previous Luscombe 100-hour inspections; one was for $27 and the other $36. My bill ultimately turned out to be $20.73—which is a fair price for an acceptable job. But here's what actually happened while I was at Tacoma:

After they had finished I examined the airplane carefully. Neither the engine or the cowlings had been washed. That immediately indicated that they could not possibly have given that engine the thorough, careful examination it should have got. Any competent mechanic automatically assumes that everything on an airplane getting a 100-hour inspection is in dangerous condition. However, the mechanics at Tacoma could not possibly have discovered any number of serious faults under the engine's normal layer of dirt and grease.

In checking the many engine nuts I could see plainly that they had not been tested or tightened; they still had their normal coat of dirt and grease. Even the slightest wrench marks would have shown in the grease on the nuts. Another thing: in order to tighten some cylinder hold-down nuts it would have been necessary for the mechanics to remove or loosen some cylinder baffles. However, no baffles on my ship had been removed. The screw heads were still full of dirt and grease.

All fairings should be removed during a 100-hour check—so that vital controls and stress points can be checked. I examined the tail fairing on my ship and noted that the screw heads still were full of the wax rubbed over them at the factory. They did, however, remove the wing fairings in order to check the wing bolts.

None of the aileron, rudder or elevator hinges had been cleaned and oiled.

In checking further I found that, in reinstalling the engine cowl, they had neglected to replace two screws that hold the cold-air ducts in place. They also reinstalled the cowl improperly so that a hose clamp stuck out on the wrong side of the cowl. Instead of replacing the cowl properly or moving the hose clamp, they bent the cowl around the clamp, chipping off the paint.

Aside from the sloppy workmanship, there were several potentially dangerous possibilities that the Tacoma mechanics would have missed. I could have had a broken or loose stud on a cylinder that they would not have discovered. I could have had a loose or cracked fitting in the tail which might have resulted in structural failure of the fin or stabilizer. And all this could have happened while I was flying in some of the roughest country in the United States.

I found my controls were too tight after taking off from Tacoma. So I made my next maintenance stop at Helena, Mont., where I told them there was "something wrong with the ailerons." The mechanic there did a good job of locating and fixing the trouble. He also washed and lubricated all the control hinges and pulleys. Meanwhile I was having trouble with my radio and, after some persuasion, managed to get the radio man at a school on the field to look at my set. He found the trouble and told the mechanic how to correct it. He refused payment when I offered it. Despite the fact that the mechanic was frequently called away from the plane to do other work, I was not charged for time that actually had not been spent on my ship. I was not charged for tie-down at Helena, either.

At Miles City I asked to have the ship washed. A man took a hose on it, did not wipe it off, and it looked worse after he finished than it did originally. The dust and dirt ran down over the windows and windshield, and he did not clean either of them. Cost: $1.50.

I crossed two plug wires after landing at St. Cloud, Minn., then told the shop foreman there was something wrong with the engine. He came out, listened to the engine, then called a mechanic and told him to remove the magneto. He did this without even checking the plugs to determine which cylinders were not firing. He worked on my plane on and off for about two hours, while I watched from the office window. Before long he discovered the crossed wires and corrected them. Back in the hangar the mechanic told me he'd found the trouble. That cost me $3.75.

At Minneapolis I complained about the fact that the airplane tended to pull to the right. A mechanic checked the steerable tail wheel and found the weak spring. His solution to my problem was to hold the rudder with his knees while he tried to stretch the spring with his hands. Obviously, this did no good; it probably would have taken the strength of several men to have had any effect whatever on that spring. There was no charge.

I asked to have the plane washed, gassed, and the idling checked at St. Paul (I had opened the primer there after landing). The foreman ruled out the wash job. "No one to do it," he said. After lunch he and a helper went to work on the idling. When they said they were finished I paid my bill ($1.25), then went out to take off. I found the primer still open, though the idling had been set so that it idled satisfactorily even with the primer open. When I closed the primer the engine quit. Rather than spend any more time there, I started the engine and took off, though it was necessary to use throttle all the time to keep it from quitting.

At Rockford, Ill., I had the idling adjusted (I left the primer in). I also asked for the wash job again. This time it was done, and it was an excellent job. The price was $6.

From Rockford I flew on into the Chicago area. Next month's article will describe what happened to me in Chicago and as I flew on into the eastern half of this survey. END

I Learned About . . .

(*Continued from page* 44)

a pilot flying today who has not "learned about flying" from one or more mishaps or silly blunders during the course of his career. It's true, of course, that every pilot accepts such accidents to others as a matter of course but rarely recognizes the fact that it *could* happen to him.

I have read so many hundreds of contributions to this series that I long ago thought I had acquired a super-sensitiveness about making silly mistakes when flying. That's what I *thought*. But when I started checking through my log book, recalling some of my flying experiences —and, above all, being honest with myself—I suddenly realized that I was looking at a cross-section of some shockingly bad judgment, plenty of carelessness—a little of everything that undoubtedly helps contribute to private flying's accident statistics.

In the past few years I have logged time in 35 different types of aircraft, which includes almost anything from a twin-engined Beechcraft down to the Thorp *Sky Skooter*. So I have had more than the average amount of opportunity to make mistakes, forget things and just generally get myself in trouble. You'll see what I mean in what follows.

There was the time I climbed out of a Fairchild PT-26 after killing the engine with the mixture control—and left the ignition switch on. Another fellow and I leaned on that prop for some time while we talked. It was a warm day, the engine was hot—and I didn't discover my stupidity until I got back in the ship to fly it home.

Or the times (I've done this twice, believe it or not) I've overlooked the advice of thousands of pilots and neglected to make a careful check on my gas supply before taking off. Once I was flying a *Navion* back from the west coast. I'd landed at the Beech factory at Wichita and had several things I wanted to do there before taking off for Chicago. So I left the servicing to the very able ground crew. As is always the case with such short visits, I stayed longer than I should and hence was in a hurry to get going. I had flown in there several times before and always received superlative service, with never a thing overlooked.

What I didn't know, of course, was that the Beech gas man apparently did not know that the *Navion's* two tanks are interconnected, and that it's easy to have the one tank opening overflow if the gas is pumped in faster than it is able to flow into the other wing tank. That can give the mistaken impression that both tanks are full to the brim. Anyway, that must have been what happened because when I landed at St. Louis wondering what had gone wrong with the *Navion's* gas gauge, I found I had about two gallons left.

The second time I had that kind of trouble was in a Taylorcraft. That plane has a small six-gallon fuel tank in front of the pilot, with a bobbing cork and wire that tells the pilot how much gas is left in that tank. Twelve more gallons

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COL. ALLAN A. BARRIE

Allan A. Barrie is a veteran of more than 18 years of executive pilot assignments. An air line pilot with more than 13,000 flying hours, Barrie was Vice President—Operations of Western Air Lines prior to the war. During World War II, he served as a Colonel in the Army Air Forces, Assistant Chief of Staff—Operations of the Ferrying Division of the Air Transport Command and directing the actions of 25,000 men who were transporting personnel and materiel in scheduled service totaling more than 34,000 hours' flying time per month. In the United States he was awarded the Legion of Merit for outstanding war service.

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F-3

are in a wing tank and you just turn a valve in the cockpit to refill the small center tank in flight. But—I forgot to check the wing tank. I turned that cockpit valve, the float kept right on going down anyway, and I ended up making an unscheduled landing for gas. If I had been over the western desert, well . . .

Another time I took an *Ercoupe* on a short flight, knew it was not full of gas, but figured I'd have plenty. Climbed to 10,000 feet to show a friend how beautiful a big city looks from that altitude on a crystal-clear day—and unwittingly ran into a tremendous head wind that blew me directly away from the airport. I got back to my home field, all right—but it took nearly all of what little gas I had left and I was prepared to make an emergency landing at a nearby Navy field if the engine had quit.

And once I was bringing a Luscombe into a field for gas after a long flight. I had ignorantly been running on the left tank for some time (there's one in each wing), and didn't realize that in a Luscombe you should normally switch to the right tank for flying in a left-hand airport traffic pattern. Anyway, at about 800 feet I started to circle the field to the left. With the left wing down and the left tank practically empty, the engine quit for what seemed like a year. I don't know yet what subconscious thought made me slam that gas valve over to the right tank, for no one had ever warned me about that danger, but I did it so fast the engine didn't have time to stop entirely.

How many times have you been told not to tangle with storms? Me too. Yet I've stupidly gotten into four uncomfortable situations, despite my better judgment. The first time I was "trying to push through," that old alibi that causes any experienced pilot to nod knowingly. I was flying an *Ercoupe* from Miami to Chicago in mid-winter. My first mistake was in relying implicitly on Weather Bureau reports (I've made that mistake too many times for my own good). I ended up flying along the bottom of a deep valley north of Asheville, N. C. The ceiling came lower and lower until I was boxed in and could only go straight ahead. I finally got out into a wide valley—and into a driving, icy rain that froze on the windshield, forcing me to open a side window to see out. I flew as low as I dared, followed a road to a river, turned down the river until I found the airport at Kingsport, Tenn. It took me five minutes to get out of that ship after I'd landed, I was so scared.

Then there was the time I was carrying two friends in a *Super Cruiser* over New York City. We'd had lunch at Roosevelt Field, which is just a few minutes' flight from Manhattan Island. The weather looked dubious, so we hurried to get off and back to Teterboro airport, 25 miles away and just across the Hudson River from Manhattan Island. I was at 3,000 feet over LaGuardia Field—almost within sight of Teterboro—when a solid wall of snow came rushing toward me from the left. I took a second look, made a steep 180, and dove for Roosevelt Field. As I circled that field for a landing, the visibility had already dropped below contact limits; it was a "flash" storm, but I had carelessly neglected to check the weather before taking off.

Summer thunderstorms move a lot more quickly, and are rougher. I just barely beat one into the Shawnee, Okla., airport one day in a *Super Cruiser*—after taking off from Wichita for Dallas, despite Weather Bureau warnings. And, not long ago, I took off from Tallahassee, Fla., for Orlando in a *Bonanza*. I'd been given a dangerously inaccurate weather report and, about 50 miles south of Tallahassee, suddenly found myself following a railroad track, flying at 300 feet in what turned out to be the tail end of Florida's latest hurricane. My worst mistake was in not turning tail for Tallahassee as soon as I hit the stuff. Instead I kept on, looking for an ex-Army field just ahead at Perry, Fla. I found it, all right, and landed there under a 200-foot ceiling in a violent rain storm. Oh sure, I know the old maxim: "when in doubt, turn back."

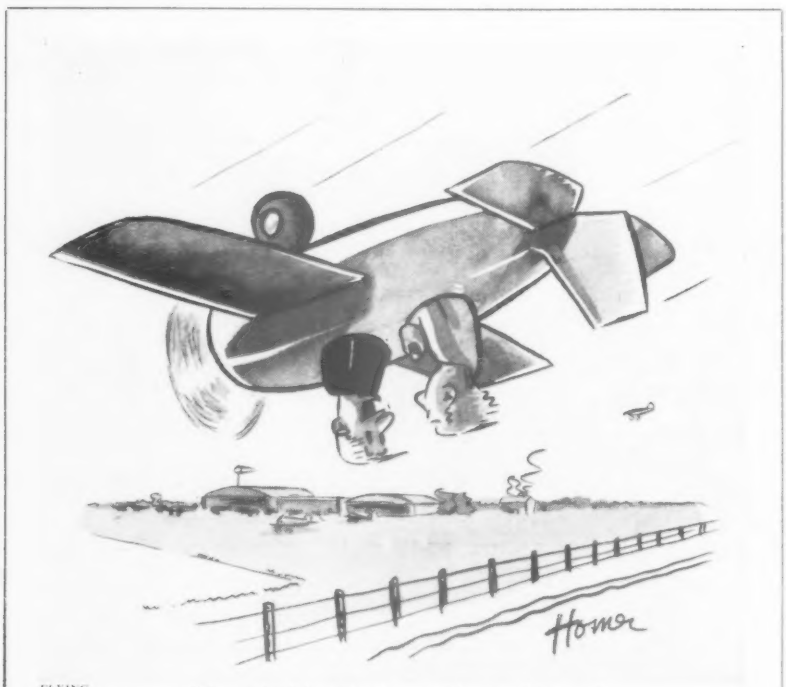
But weather is not my only shortcoming. Take the simple, elementary business of running up the engine before take-off. One winter day in Washington I was to fly an *Ercoupe* down to the Martin aircraft plant outside of Baltimore. The Washington field was small and there was plenty of drifted snow. The only runway into the wind was fairly short, with high snow banks just off each wing tip. It was difficult just taxiing out to the end of that runway. Anyway, I got out there and ran up the engine. Mags checked okay, and I thought I checked the carburetor heat too.

My passenger was heavy and so was I. I didn't like the runway situation—nor did I like the cluster of houses on a small hill right off the end of that runway. So I got back as far as I could, gave her full throttle, then released the brakes for a quick take-off. We rolled, those houses got closer, and I finally had to yank her off the ground. We staggered just across the roof tops and it took nearly five minutes to climb to a safe altitude. Had I taken the trouble to *carefully* run up that engine I would have saved my passenger and myself from an awful scare. We found later that the engine didn't turn up anywhere near maximum take-off r.p.m.—because some dimwit had wired the carburetor heat control in the full-on position.

You've heard it said many times that it's always best to stall a strange plane in the air to get the feel of it. Well, I do that now. But the advice didn't help me much; I had to learn it the hard way. Like the first time I ever flew a *Super Cruiser*. It was cross-country, from New York to Lock Haven, Penn. I knew the plane was a "floater" but that meant little to me until I tried to land at Lock Haven. I skidded, mushed, slipped—and made four passes at the field, without getting down. Finally my passenger (Bill Strohmeier, a sharp pilot if I've ever seen one) tactfully offered to show me how.

And I made the mistake of trying to land a heavily-loaded Luscombe at Milwaukee's lake front airport one day, using the plane's airspeed indicator instead of my head. I'd never flown that particular airplane before, yet I flew in on the instrument—which, of course, was inaccurate. Result: I stalled what seemed to be several feet in the air and came down on all three points hard enough to be heard in downtown Milwaukee. So now I stall *every* strange plane in the air, if for no other reason than to see what its airspeed reads at the stall.

Then there was the time—which prob-



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ably is my ultimate in fat-headedness—when I was flying a Stinson into Chicago's busy municipal airport. There was a Stinson man with me. I'd been doing the flying but, as I turned on my final approach, I thought I got an "I'll take over" signal from the man beside me. I just took it for granted and didn't bother to check. The airplane held an excellent glide, flew right up the middle of the wide runway, landed, bounced a couple of times, then rolled to a stop. Then my passenger and I both discovered that each of us thought the other was flying the plane—which actually had landed itself. We had just been resting our hands on the controls.

A single little paper match almost caused my first and only crackup. The plane was an old 90-h.p. *Voyager* owned by the Motorola radio company. My companion was Don Mitchell, head of engineering for Motorola and the man who designed the push-button all-purpose set that is standard equipment in the *Bonanza*. The first experimental radio was installed in this *Voyager*, which Don let me fly from Wichita to Chicago.

Anyway, the tuning knob vibrated off frequency in flight, so Don devised a temporary "lock" by jamming a paper match in between the knob and panel. It worked fine—except that we both forgot about the match when it came time to retune the set after taking off from Kansas City. I pushed a tuning button—and the thread that turns the tuning condenser snapped. Don tried to retie the thread in mid-air but that proved impossible.

So we looked up the next airport ahead—a CAA intermediate field—on the map, checked it in the Airman's Guide, found it after a few minutes' flying, and turned in for a landing. There were the long runways mowed in the grass, the orange and white CAA building in the corner, and the revolving beacon. Just as I levelled off to touch the wheels to the runway, Don yelled "look out!" I looked over the nose in time to see a narrow steel fence post, and I instinctively slammed hard on the left brake. The plane veered left just as a thick single strand of electrified barbed wire miraculously missed the propeller, hit the underside of the cowl, slid along to the landing gear leg, where it sawed away at the joint until the plane rolled to a stop. Luckily, the damage was slight.

It turned out that the CAA had sold that field and, technically at least, it was the property of two farmers and had been closed. Except that no one other than the CAA and the farmers knew it. That fence was set directly across the middle of the runway. Nevertheless, had I used the maximum amount of caution, I would have "dragged" the field first, particularly when I saw that there were no other planes on it.

Ever been caught in the dark, hunting frantically for an airport? I know a lot of pilots who have—all because they didn't make a simple check on the time of actual sunset at their destination. That happened to me recently too, and in a *Bonanza* with two unsuspecting passengers. I took the casual off-hand remark of the pilot who flew the second *Bonanza* on a flight from Orlando to Miami; he was an old-timer in Florida, and said "we'll have plenty of light at Miami."

Well, it was dark at Fort Lauderdale. Which means, of course, that I should have landed at any one of the several airports I'd flown over. But my two passengers were radio men who had begged us to fly them and their equipment to Miami for a last-minute broadcast. Being human, I let their urgency influence my decision. I turned on the *Bonanza's* navigation and instrument lights, and followed the tail light of the other *Bonanza*. When we reached Miami I suddenly realized that the airport we were to land at was unlighted. Mentally I made up my mind that I'd make one pass at the dark field—following the other ship in—then I'd pull up, climb, and call the nearby Navy field for guidance, even GCA if necessary.

The other *Bonanza* made a wide, descending circle around the dark area where the airport was supposed to be. I stayed high and watched. Soon the other pilot turned on his landing lights and I saw the airport fence and a blacktop runway in their beams. I lined them up with a neon gas-station sign across the road, let down gradually, found the runway with my lights, and landed. That, incidentally, was my first night landing.

I could go on indefinitely. Little yet obvious things, like the time I didn't bother to check the trim tab on an old *Cruiser* and started off on a long cross-country trip only to find it jammed full to the rear; I spent the whole trip holding the stick hard forward.

Or the time I made the mistake of flying an *Ercoupe* out of a muddy Iowa sod field; I must have brought 20 pounds of mud back to Chicago after taking off between a barn and a tree while trying to pull the nose wheel out of the mud.

Or the time I landed a Funk F2B at Hannibal, Mo., for gas. Came in high, floated down most of the runway, then didn't have enough sense to go around again. Forced the plane onto the ground, slammed on the brakes, and came to a stop a few feet from the fence.

And once, when I was ferrying a new J-3 *Cub* from Lock Haven to Chicago, I couldn't figure out why the engine was throwing so much oil it covered the windshield—and I didn't take the time to stop and check. When I finally did, after having added oil at about every stop, a mechanic at Goshen, Ind., knew exactly what was wrong as soon as I asked the question. He got a screwdriver, walked out to the ship and showed me that all four screws on all four rocker-box covers were loose enough to be taken out by hand. The cylinders had been pumping oil out through all the cracks. He told me a number of *Cubs* had come through Goshen with that trouble lately, and had stopped for a check.

Then there was the time I got myself lost just because I got interested in a radio show long enough to miss a few check points—something I don't like to do over the swamps of Louisiana in a *Bonanza* . . .

Without exception and in every instance, I should have known better. And without exception, it required no special brain power to know I should have done otherwise. They were simple things.

So it's quite obvious that you *can* make mistakes—even serious mistakes—and get away with it in the air. There's nothing mysterious about those mistakes; they are basically the same as those all of us make on the ground. Except that I have two large scars as the result of mistakes made in automobiles (no, I wasn't driving), while I have yet to be scratched in an airplane. END

Air Power - - Our Only Insurance

(*Continued from page* 13)

flexing. We who are charged with the nation's defense, although we have great faith that international difficulties can be settled amicably, must look at the picture realistically. We *know* that the one nation with which we are most frequently at odds across the conference table remains powerful, prepared and from the military standpoint, sagacious.

Our defense is to keep a jump ahead of any potential enemy in trained personnel, modern equipment, and technological advances. We will be able to do this only as long as the resources available to us equal or exceed those which other nations are pouring into their military machines.

But, you may say, what about "our" atom bomb? The answer, of course, is that the bomb will be "ours" only until our competitors develop one of their own. Your own newspaper has given you an idea of how long this will be—only a few years at the most.

Then you say, even if they had an atomic bomb, they couldn't deliver it. The fallacy here lies in the fact that, since two of our B-29s fell into Russian hands in 1944, their aeronautical engineers and production men have been busily applying themselves to the task of mass-producing this type of heavy bomber.

As a matter of fact, as long as a year and a half ago, Russian purchasing missions in this country tried to buy a large number of sets of tires, wheels and brake assemblies for B-29 aircraft. They were unsuccessful—but it is a certainty that their designers have worked out an answer to this supply problem, and that bombers comparable to our own B-29 are flying operationally today, behind the iron curtain. [See photo on page 56.]

Not a pleasant prospect—enemy B-29s dropping atomic bombs on American cities—is it?

Yet, that is a prospect we must consider as a possibility unless we prepare not only an adequate defense, but a retaliatory arm so powerful that it will smash any enemy offensive before it gets rolling.

To the limit of the resources at our command, we of the Air Forces are pre-

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paring on that basis: first, to ward off the enemy blow which would start the war; second, to deliver immediately a crushing, paralyzing, final retaliatory blow.

We are not ready yet.

Whether we will be ready *in time* depends largely on the full support of every American.

The organization we are planning to bring about this powerful twin plan for defense embodies these components:

1. Seventy combat groups in constant operational readiness, supported by 22 separate and specialized squadrons. We will need 6,869 aircraft, including training planes, plus 400,000 military and 150,000 civilian personnel, to keep these units on the line.

Russian B-29 modification is "Ilyushin" transport (top)—proof that Soviets copied U.S. planes seized in 1944. Compare it with Stratocruiser (lower) also based on B-29.

2. A trained and equipped Air National Guard of 24 fighter groups and three light bomber groups, trained and ready to get into action on a "minute man" basis at the M-Day call. We will need 3,212 first-line aircraft, plus 57,000 personnel, to keep this Air National Guard in readiness.

3. An Air Force Reserve of 34 groups in various aircraft categories, available for a call-up into active duty within 60 to 360 days. We will need 2,360 aircraft to make our Air Force Reserve efficient, plus 48,000 personnel in an "augmentation reserve" to be called up in emergency to expand regular Air Force groups from peacetime to war strength.

4. In addition to the planes and men who will do the fighting, if called upon, we need a myriad of supporting elements—a sound and aggressive domestic aircraft industry, a progressive air transport system, a system of operational bases, a research and development program in not only aircraft and armament but in electronic and scientific weapons, and a host of others . . . all integral parts of the over-all defense plan which has been carefully compiled.

This program adds up to 97 aircraft groups in combat virtually immediately upon the start of hostilities, and 34 more groups from the organized Air Force Reserve within 60 to 360 days, a total of 131 groups or a little more than half of our peak strength in the recent war. This 70-group program would put 12,441 airplanes into action, should we be attacked, with a reserve of 8,100 more.

Unfortunately, the 70-group program has not been achieved. By the first of this year (1948) we were able to build only to 55-group strength with the resources available to us. The National Guard, on which so much reliance is placed as the M-Day minute-man force, had at year's end substantially less than 2,000 airplanes, as against a minimum of 3,212 needed for security. The Air Force Reserve, composed entirely of veteran pilots who keep their hand in on weekends so that they will be able to resume their duties if war occurs, has to be content with a comparative handful of slow training airplanes. These men should be getting familiar with the radically-advanced aircraft types they will be called upon to fly should war come.

Contrast this with what our competition is doing. Our intelligence, scanty as it may be on this particular nation's plans, tells us that she maintains some 14,000 planes in *first-line combat units* today. Her aircraft plants, which turned out more than 40,000 aircraft in 1944 despite the fact that she was under attack by a powerful invader, operate full-blast and unmolested in strict security. Top-flight engineers, scientists, production men and technicians of the unusually-progressive German aircraft industry are converting their know-how into a bigger and better Russian aircraft industry.

It would be more than folly to fail to heed this handwriting on the wall. If we do not prepare *now*, we will have committed national suicide if a break comes.

It is important to realize that this job of preparedness is not entirely up to the military and economic planners of our country. Fortunately, there are many opportunities for *everyone* to play an important part in building up a powerful defense that no nation will be capable of challenging successfully.

Public opinion is one of our most potent resources. When the urgency of the situation is impressed upon the American citizen, it in turn is reflected in the decisions made by his representatives. I am not a lobbyist by profession or inclination. But I am confident that, when the American people realize the need for a strong aircraft industry and strong aerial defenses, their desires will be translated into legislative action. And, without that action, we are seriously hampered. Adequate air defense, the only practical method of keeping aggressors in their own backyard, costs billions of dollars—but what precious metal is more valuable than lives and freedom?

In addition to contributing the weight of his opinion, the American citizen can be of personal service to our expanding air force. Naturally, I do not mean that he should join the regular U. S. Air Force as a ground crewman or pilot if his circumstances do not warrant. But there are many "sideline" activities which demand participation and support of student and businessman, laborer and schoolteacher, executive and housewife.

The Air National Guard and the Air Force Reserve *need* men. One of the unfortunate aspects of the Air Force Reserve program is the fact that to date it is largely made up of all chiefs and no Indians. We do need pilots to activate the Air Force Reserve program, but we need the enlisted reservist desperately. The veteran enlisted man joining the Reserve will enjoy many benefits—contact with technical progress, training and education, practical experience, club, recreational and social privileges, and full pay for rank when he's on active duty. It's a "painless" way to keep in touch and move up the Air Force ladder, as a sideline to regular civilian life.

The Civil Air Patrol offers another outlet for the civilian who wants to help. Coming into being just a week before Pearl Harbor, the CAP did a tremendous wartime job—far above the most optimistic expectations of the military or even its own sponsors. Civilian flyers on coastal anti-submarine patrol, in courier service, and in educational work all over the country were of mighty moral and

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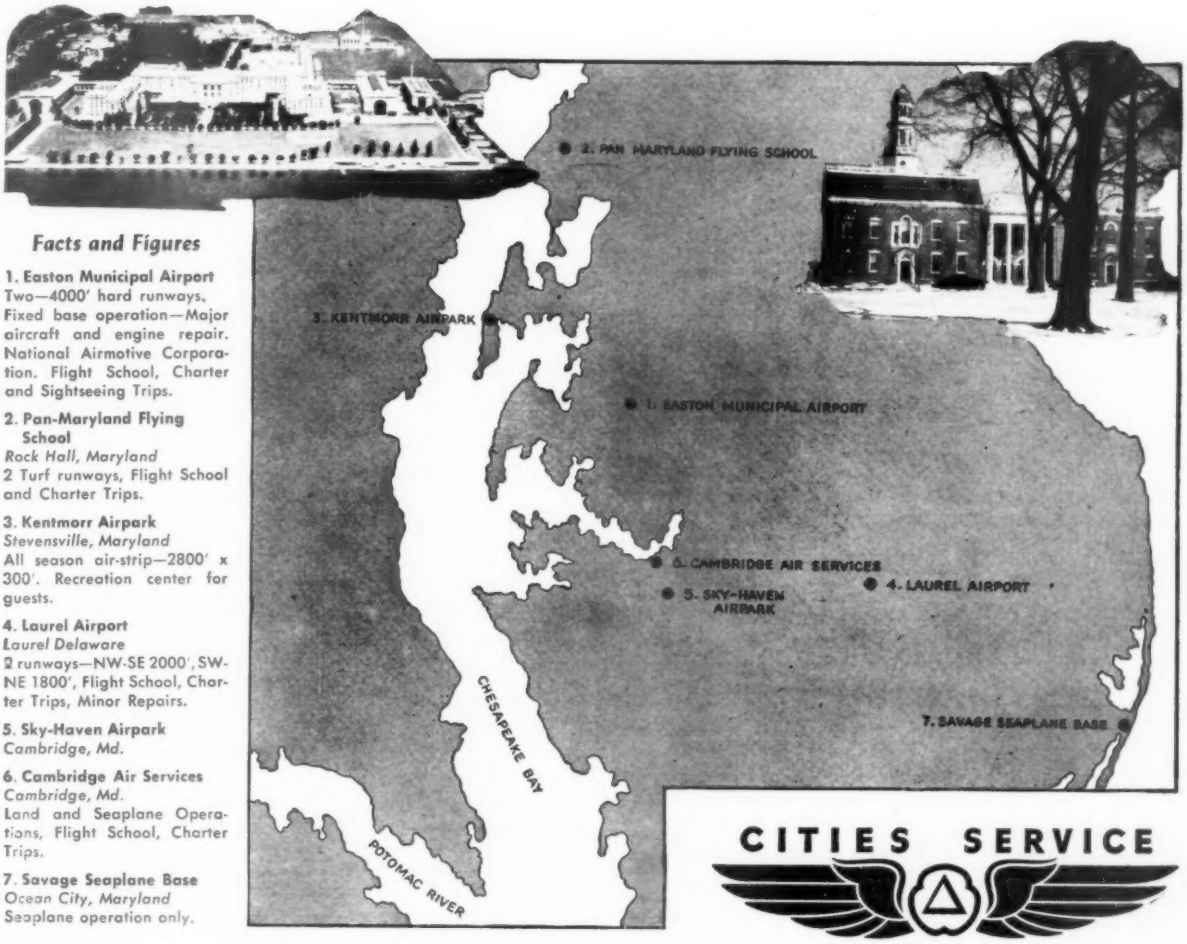

Facts and Figures

1. Easton Municipal Airport
Two—4000′ hard runways. Fixed base operation—Major aircraft and engine repair. National Airmotive Corporation. Flight School, Charter and Sightseeing Trips.

2. Pan-Maryland Flying School
Rock Hall, Maryland
2 Turf runways, Flight School and Charter Trips.

3. Kentmorr Airpark
Stevensville, Maryland
All season air-strip—2800′ x 300′. Recreation center for guests.

4. Laurel Airport
Laurel Delaware
2 runways—NW-SE 2000′, SW-NE 1800′, Flight School, Charter Trips, Minor Repairs.

5. Sky-Haven Airpark
Cambridge, Md.

6. Cambridge Air Services
Cambridge, Md.
Land and Seaplane Operations, Flight School, Charter Trips.

7. Savage Seaplane Base
Ocean City, Maryland
Seaplane operation only.

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physical support to the military. The CAP is still on the job, and will be in case of another emergency.

The Air Defense Command, as a means of building up a reservoir of people with skills peculiar to Air Force requirements, also encourages private industry to sponsor educational activities under an "affiliation program." The sponsor offers his plant facilities for the training of Air Force Reservists in operation and maintenance of equipment which is used by the Air Force. Sponsorship of such affiliation classes is highly recommended to manufacturers of radio equipment, aircraft and aircraft engines, and products allied with the Air Force program.

The youth of our country, and their parents, have a splendid opportunity to participate, by supporting aeronautical programs in our schools. We believe that aviation should be taught from grammar school up. The increase in the number of high schools and colleges offering aviation education is gratifying. I submit that preparation for a career in aviation ranks with schooling for any other profession—and there is no better way to serve the nation than to acquire such training and place it at the country's disposal.

These are ways every citizen can build his Air Force and, through it, an industrial and military machine so powerful that no nation would dare challenge it. But without the active support and participation of everyone, that weapon will remain but a plan.

And the best-laid plan of any nation makes mighty poor ammunition until it's put into effect. It is up to the nation to transform our plan into a weapon. END

Georgia Sea Islands

(*Continued from page* 38)

favorite sight. The Wesley brothers, founders of the Methodist Church, were rectors at Christ Church not far from Frederica. The Battle of Bloody Marsh, in which Oglethorpe freed the Atlantic coast of the Spanish menace, was fought a few miles from the fort and is regarded as a decisive event in U. S. history.

During Revolutionary times St. Simons suffered heavily at the hands of the British fleet. Homes of the settlers and a large trading post were wiped out. Later the island was developed agriculturally and became the home of Sea Island cotton, which today provides much of the fine cloth used on small airplanes. The island was the home of several famous persons, such as Maj. Pierce Butler, planter; James Hamilton Couper, agriculturist and conchologist; Thomas Butler King, congressman and first proponent of a transcontinental railroad.

St. Simons is the only one of the large islands to be connected to the mainland by a highway and consequently has become a favorite vacation destination of Georgians. Among its diversified attractions are fine beaches, casinos, an auditorium, bowling alleys, an excellent airport, a Coast Guard Station and a resort colony. At Sea Island (a small, eastern part of St. Simons), there are the beautiful Cloister Hotel, the King and Prince Hotel, golf courses, yacht club, skeet ranges with an assortment of hunting, fishing and bathing developments. The Cloister is the best known resort in the area with rates from $14 per day up. The King and Prince, smaller, but just as good, has rates starting at $5 per day.

This region is a year-round vacation spot, attracting Georgians from cities such as Brunswick, Macon, and Atlanta during all seasons, and northerners in the winter. Brunswick is near the ocean, and is the region's largest city. A modern airport makes it accessible to flyers. Yachting enthusiasts familiar with the Inland Waterway will recognize the city as an important stop on that route. (While primarily a small-boat route, this waterway is finding increased popularity among seaplane and amphibian flyers on southward trips because it offers a never-ending stretch of sheltered water, which is both a guide and a haven from weather.) There are hotels in Brunswick with rates from $3 up. The Chamber of Commerce maintains a Visitor's Club where complete information about accommodations and vacation activities is available. Flyers can call in person or write for information about the Sea Islands.

Winter climate of the area is not exactly tropical, but is consistently mild. Only on a few rather warm days will swimming be comfortable during mid- and late-winter; in fact it is well to bring along a jacket or sweater.

Georgia offers excellent salt water fishing for a variety of species. Among the game fish found in coastal waters are sea bass, red snapper, summer and winter trout, grouper and croaker, mackerel and bluefish. Offshore there are shark and swordfish. Miles of hard-packed beaches offer natural flight strips for lightplanes and fishing parties can often be seen surf casting on lonely beaches with planes parked a few yards from the water. For the less adventurous there is always good fishing from the docks. Salt water fishing requires no license and tackle is quite inexpensive.

These Sea Islands are low, lonely places, covered with oaks, pines, and magnolia, all shrouded with Spanish moss. Marsh lands cover vast areas.

The Cloister Hotel on Sea Island is a complete resort development. The hotel itself is a large Spanish-style building with elaborate facilities. Surrounding it are an excellent golf course, bridle trails, hunting and fishing lodges, skeet ranges and a swimming pool. More modest accommodations can be obtained in tourist homes, which have rates from $2 up.

At the other end of the Golden Isles is Savannah, on the Georgia-South Carolina line. The famous Savannah Beach on Tybee Island, a few miles east, has both inexpensive and very expensive accommodations for vacationists and is a sport and fishing center.

While not exactly part of the Sea Islands, the Okefenokee Swamp, 30 and 40 miles inland, is so interesting and so quickly reached that many pilots include it on their itinerary. It is possible to land outside the swamp, at Waycross, and inspect it closely by land. The wise pilot will not venture over the swamp by air, especially in a single-engined plane. There are board walks, a 75-foot observation tower, boat tours, exhibits and shops. The swamp covers an area of more than 600 square miles and is the largest of its kind in the east. Admission costs 50 cents, boat rides 50 cents to a dollar.

Except for Darien, which is 15 miles NNE of Brunswick and which has an airport, there are few towns in the Sea Islands. Inland, the country is mostly covered with pine forests. The Jacksonville (P-8) sectional chart shows the country, and on this chart is a notation that contact flights between Savannah and Jacksonville should follow the Seaboard Air Line Railroad some miles inland from the ocean, unless on flight plan approved by Jacksonville ATC. It is suggested that visiting pilots get local advice at either of these cities before heading directly out over the Islands or over the swamps which stretch for miles.

Both Savannah and Jacksonville have several airports, but the fields which will most directly concern visitors are Brunswick Airport at Brunswick, McKinnon Field on St. Simon Island, St. Mary's Airport at St. Mary's, Darien Airport at Darien, and, should Okefenokee Swamp be on the agenda, the Waycross CAP airport.

The Sea Islands of Georgia, with their modern resorts and towns located in an otherwise lonely region and with good airports and sports facilities, are within easy reach of the east coast lightplane pilot. —ROBERT J. WHITTIER

SOME AIRPORTS SERVING GEORGIA SEA ISLANDS

Name	Telephone	Nearest Town and Distance	Longest Runway	Gas Grades	Service Facilities	Additional Information
Brunswick Airpark (31°11'-81°29')		Brunswick 2.2 mi. NNE	2,600 ft. unpaved	80	A&E mechanics, transportation to town, restaurant 1 mi. away.	Brunswick Chamber of Commerce, or: Edsel D. Zetterawer, Mgr., Brunswick Airpark.
McKinnon Field (31°09'-81°23')	14 or 9140	Sea Island 1 mi. SE	4,100 ft. asphalt	80-91	Repairs, day and night, hotels, tourist homes.	Harry Smith, Manager, or: Brunswick Chamber of Commerce.
St. Mary's Airport (30°44'-81°33')		St. Mary's 1.7 mi. NNW	5,000 ft. paved	80	Taxi, accommodations, beacon, lighting.	Brunswick Chamber of Commerce.
Darien Airport (31°22'-81°25')	9	Darien 0.8 mi. SE	1,300 ft. unpaved	80	Day service, suitable to small planes only due to obstructions.	C. A. Stebbins, Mgr., Darien Airport.
Waycross C.A.P. Airport (33°45'-82°24')		Waycross 2.6 mi. WSW	2,100 ft. unpaved	80	Day service, taxi to town.	R. J. Brewster, Mgr., Waycross C.A.P. Airport.

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Automatically responds to natural forces. Increases pitch as air speed increases. Gets plane to cruising level fast, on minimum fuel.
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Aeromatic automatically maintains the most advantageous pitch for top cruising on minimum fuel at any level up to critical altitude.
Safer Landings:
Aeromatic Propeller automatically adjusts its pitch for a long flat glide. Moves to low pitch instantly for a quick pick-up if pilot over-shoots his field.
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Survival in the Air Age

(*Continued from page 16*)

The report goes on to point out that the Government has built or improved many airports during and since the war —which benefit private flying. An estimated $125,000,000 was spent for flight training in 1946 under the GI Bill of Rights. All this money filters down to all phases of the personal flying industry.

The Government has helped train hundreds of thousands of military and civilian pilots. "This great mass of pilots will decide the near future of personal aviation," the commission says. "If enough of them do not continue flying to support the personal plane industry, *their neglect should be an unmistakable sign to airplane designers that a new airplane is needed* which will provide more utility at a lower operating cost.

"If, in fact, private aircraft do possess a significant economic potential, the commission is confident that private enterprise will seize the opportunity as it already appears to be doing in the development of lightplanes for executive transportation."

The commission believes that private flying should be encouraged. But it also believes that continuing funds for airports, navigation and landing facilities, and the appropriations already made for veterans' training are sufficient.

They make only one departure from this general rule of no added aid to private flying. They believe that NACA should continue some research directly applicable to small planes. Emphasis should be placed on some device to make possible lower landing speeds and higher top speeds. They specifically recommend further research on boundary-layer control. This research work should be undertaken by NACA with the proviso that it be limited to basic research and not applied to commercial development.

ASK SIMPLER REGULATIONS

The commission further urges that the Government simplify and reduce regulations affecting private flying. They recommend that state aeronautical agencies help the CAA in enforcing regulations—but the power to regulate should still be confined to the Federal Government.

Present requirements for certificating new lightplanes are held to be too complex and to retard experimental design. "The Federal Government should continue to promulgate aircraft design standards in collaboration with established technical groups, research agencies and safety organizations, but compliance with these standards should be the primary responsibility of the manufacturer. After careful initial checking for competence, each should be required to certify to the airworthiness, the proper flight characteristics and operational limitations of the production type and to the fact that the airplane has been submitted to an exhaustive performance and service test. The present testing procedure now executed by the CAA should be conducted and sworn to by the manufacturer." The Federal Government would have the power to revoke manufacturers' certificates to build planes under this honor system.

To aid the now ailing military plane-building industry, the commission does not recommend subsidies. Instead, it urges procurement of new planes and engines at a rate high enough to keep the industry strong and healthy. In addition, instead of the piece-meal procurement program based on biennial appropriations, it urges that plane orders be placed for delivery over a five-year period.

The commission urges a tightening of security regulations on advanced research, and recommends that research agencies, too, be permitted to make contracts over a five-year period. The commission also recommends that the present top salary limitation of $10,000 per year be removed.

URGE HIGHER MAIL PAY

For the airlines, the commission recommends an increase in mail rates. It asks that Congress seriously consider carrying all first-class mail by air that could benefit from it, and inaugurate an air parcel post. It urges that new types of transport planes be operated regularly on nonpassenger schedules for a specified mileage before passengers are carried. The CAB is urged to defer for a short time decisions in new route certification cases, and to clarify its principles on determining routes.

A revolutionary new proposal is that an Aircraft Development Corporation be established by the Government to pay all or a part of the development cost of cargo or other nonmilitary commercial planes, components, navigational aids and safety appliances. The corporation would also be authorized to make loans to manufacturers for development costs when such financing cannot be obtained from civilian sources.

A complete reorganization of the CAA and CAB is proposed. A new Department of Civil Aviation would be formed within the Department of Commerce, but it would be headed by a full-fledged Secretary of Civil Aviation. The CAB would continue to be an independent agency concentrating on its main function of economic regulation, but it would be located within the Department of Civil Aviation "for housekeeping purposes only." The CAB would give up its safety regulations. An Air Safety Board would be established within the Department of Civil Aviation. This has recently been a controversial subject.

Looking farther into the future, however, the commission urges eventual coordination of all executive transportation functions of the Government in a Department of Transportation, under a Secretary of Transportation who would supersede the Secretary of Civil Aviation. Here are the recommendations in detail:

NATIONAL SECURITY

The commission faces squarely the problem of the enormous cost of increasing military aviation. "Eighty-five per cent of our total Federal budgets since 1915 have been for war or preparation or payment for war.

"For strategic purposes we must divide the future into two parts—the present Phase I during which we may assume that we have a monopoly on atomic weapons, and Phase II, the time when other nations will have atomic weapons in quantity and the equipment to deliver them in a sustained attack on the United States mainland.

"It is proper to assume, for our present planning purposes, that other nations are not now producing atomic weapons in quantity.

"It would be an unreasonable risk for our present planning purposes to assume that other nations will not have atomic weapons in quantity by the end of 1952.

"Biological weapons are undoubtedly being studied in all parts of the world. In an all-out attack on the United States the possibility that they may be used should not be overlooked. They may be delivered by the air or by preplacement by enemy agents.

"It is probable that other nations will develop atomic weapons before they develop supersonic bombers in quantity with a striking range of 5,000 miles, or supersonic accurate guided missiles with a 5,000-mile range. Nevertheless, it would be unwise to assume, in the planning of our defense establishment, that other nations will not have the planes and missiles capable of delivering a sustained attack on the United States mainland by the end of 1952.

ANYTHING CAN HAPPEN

"On first impression it might seem that a major war during Phase I is unlikely; and this opinion has been expressed to the Commission by high military authorities. There is, however, such a thing as blundering into a war, and we must be prepared for war during Phase I. In Phase II we need an even stronger force. An attack during Phase II would be extremely violent. What we must have and can support in Phase II is a reasonably strong defensive establishment to minimize the enemy's blow, but above all a counter-offensive air establishment in being which will be so powerful that if an enemy does attack we will be able to retaliate with the utmost violence and to seize and hold advanced positions.

"The Air Force is inadequate even for this Phase I when we are relatively free from the danger of sustained attack on our homeland. The Air Force is hopelessly wanting in respect of the future Phase II period when a serious danger of atomic attack will exist.

"The Air Force in being must be increased from its present level to a minimum regular establishment of 70 groups with 6,869 first-line aircraft, an Air National Guard of 27 groups with 3,212 first-line aircraft, and an adequately equipped 34 group Air Reserve. The level of procurement of new aircraft must be high enough to keep this force modern at all times. An adequate reserve, now estimated by the Air Force at 8,100 aircraft, must be created and kept in a proper state of modernization. We must start now on this program and complete it before the end of 1952.

"The Navy Air Arm as presently con-

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stituted is adequate. The Navy needs, however, additional funds for the procurement of new aircraft to replace the World War II aircraft which are rapidly becoming obsolescent.

"The current budget for the Military Establishment totals $10,098,000,000. Two thousand eight hundred and fifty million dollars is for the Air Force, $4,037,000,000 for the Navy, and $3,211,000,000 for the Army. Out of the total budget of $10,098,000,000, $4,050,000,000 is for naval aviation and the Air Force.

"The Commission recommends that the increase in the Air Force to 70 groups be started at once and be completed by the end of the year 1952. This will require an increase in the Air Force budget from the present level of $2,850,000,000 to $4,150,000,000 for the calendar year 1948 and $5,450,000,000 for the calendar year 1949.

"The Navy must immediately contract to increase its annual procurement of airplanes in order to equip properly the present fleet with modern planes as World War II reserves are exhausted. The Navy budget should be increased by $192,000,000 in the calendar year 1948 and by a further $310,000,000 in the calendar year 1949.

"The foregoing recommendations of the Commission would increase the military budget from its present rate of $10,098,000,000 to $11,590,000,000 for the calendar year 1948 and to $13,200,000,000 for the calendar year 1949.

"The Air Transport Command and the Naval Air Transport Service should be consolidated into one military air transport service which would handle all scheduled transport work for the Army, Navy, and Air Force.

AIRCRAFT MANUFACTURING

"A strong aircraft industry is an essential element in the nation's air power.

"As the minimum level to which the industry must be held to provide a safe base for expansion in an emergency, we have adopted the general range of requirements of the Air Coordinating Committee in its report of October 22, 1945. The Air Coordinating Committee adopted two levels. The lower level was an estimate that the aircraft industry needed military purchases of 30,000,000 pounds of airframe weight annually. This lower level was on the assumption that the maintenance of world peace was well assured and that a substantial degree of disarmament had taken place. The second level proposed by the Air Coordinating Committee was for 60,000,000 pounds of airframe weight annually. This second level was on the assumption that world conditions were such that the United States needed a substantial striking force ready at all times to cooperate in the maintenance of world peace. We believe that military purchases of aircraft of 30,000,000 to 40,000,000 pounds annually in addition to demands for commercial and private planes would provide a sound basis for expansion. . . .

"No artificial stimulation to achieve this result is necessary. If the program outlined is carried out the necessary base for expansion of the aircraft industry will exist. The rate of procurement recommended (by the Commission) would increase the present military procurement (which is now at the rate of about 21,000,000 pounds annually) by contracts for an additional 13,000,000 pounds in the calendar year 1948, and for 22,000,000 pounds in the calendar year 1949 more than in 1948.

"We recommend that the Armed Services plan their aircraft procurement as far in advance as possible and that Congress provide the legislative base for such planning. We recommend the placing of orders for planes for delivery over a 5-year-period whenever possible.

AERONAUTICAL RESEARCH

"Intensive research and development in aeronautics is essential to the national defense and to the national welfare. During World War II we concentrated on the development of existing types of aircraft for production and practically abandoned fundamental research in the aeronautical sciences. By VJ-day our reserve of research information was largely exhausted.

"Our fundamental knowledge of aerodynamic phenomena must be extended in all speed ranges, particularly in the supersonic. The provision of additional funds will not of itself solve the problem—the most serious shortage is in personnel.

"Other nations are busily at work in aeronautical research. Although we have difficulty in obtaining information from other countries, they have almost complete access to our data. We publicize our latest advances in the aeronautical arts widely. The Commission believes that rigid enforcement of wartime security measures with respect to advanced aeronautical development is necessary.

"We recommend that the possibility of employing atomic energy for the propulsion of aircraft be followed up.

"We believe that more coordination of Government work on research on guided missiles should be provided.

"Research and development on gas turbines and rocket engines should be pursued diligently, but research and development on piston type engines should not be abandoned. The conventional combination of the piston engine and propeller will be useful for many years for both long-range bombers and transports.

"More research effort must be put into the development of systems for making blind landings with aircraft. This is presently under consideration by the Air Coordinating Committee.

"Each aeronautical research agency should be allocated a lump sum annually, the appropriation to be based on its estimated requirements. Legislation should be enacted to authorize research agencies to make contracts to cover a 5-year period.

"The United States is seriously short of equipment for research in the transonic and supersonic speed range. The 16 supersonic tunnels planned under the so-called Unitary plan of the NACA should be authorized and installed as quickly as possible. The remaining wind tunnels projected under the Unitary plan should be constructed with such priority and at such rate as recommended by the Research and Development Board.

CIVIL AVIATION

"The airlines are now passing through one of the most serious crises of their history. This situation is significant for two reasons. If not relieved, it will contribute to the deterioration of the airline service to the public. The second reason is that as a potential military auxiliary the airlines must be kept strong and healthy.

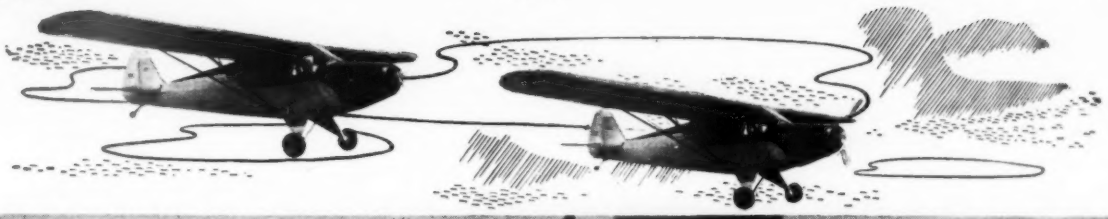
"Although some airline problems of 1947 may differ from those of the prewar period, the over-all situation is the same: The revenue from passengers and cargo, plus a revenue for the carriage of the mail roughly equal to the passenger rate, will not support the operations of many of the companies. If they are to continue in operation and start again up the ladder toward self-sufficiency, the Government will have to increase mail rates.

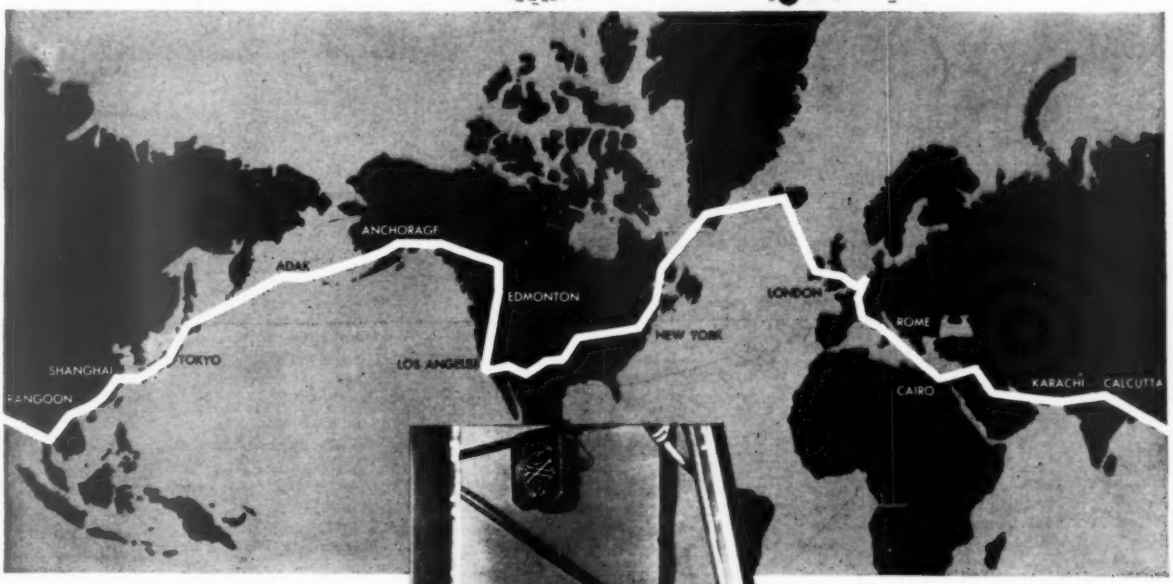
"The carriage by air of all first-class mail which can be expedited thereby and the inauguration of a parcel post by air should be given serious consideration. . . .

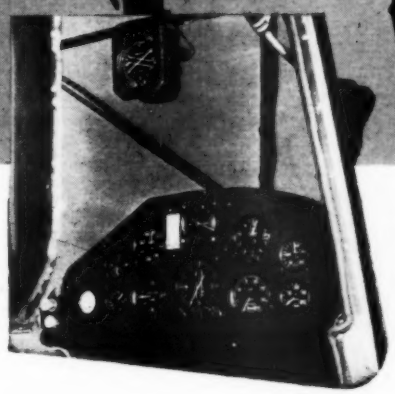
"It is especially important to increase the regularity of service. Airlines will not have mass transportation until people are reasonably certain that they can depart and arrive on schedule. For safety and regularity a basic requirement is a nationwide system of air traffic control, navigation, and landing aids. The Federal Government must accept the financial burden of providing these aids until those who use them are in a financial position to pay their fair share of the cost. Agreement must be reached as soon as possible by the interested private groups and responsible Government agencies on a common system of landing aids for immediate installation which will adequately serve both civilian and military needs. Government expenditure for electronic aids to air traffic control, navigation, and landing will do more than anything else to advance the air lines toward self-sufficiency.

"We recommend that the Civil Aeronautics Board defer for a short time decisions in new route certification cases. This is not to be construed as a freezing of the present route pattern, which would certainly be undesirable. There is, however, a widespread confusion as to the principles which guide the CAB in route determinations. There is need for a comprehensive survey of the present situation. If the CAB does not develop a clear-cut plan for an over-all domestic transport pattern, the Congress should give serious thought to giving the over-all planning function of route development to the Secretary of Civil Aviation recommended later. . . .

"We recommend that the Civil Aeronautics Board prevent the control by surface carriers of the United States air transport system or any important segment thereof. We believe that individual progressive carriers, desirous of developing air transport as part of a coordinated service, should not be automatically prevented from such action simply on the grounds that they are surface carriers. We recommend that the Congress enact







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legislation clarifying these two points.

"We recommend that the CAB be given economic control of all air carriers for hire.

"There is a real need for feeder air lines in those areas whose topographical features make surface connection between cities unsatisfactory. We recommend that the present experimental period for feeder air lines remain at three years. If it becomes evident that this period can be extended without burdensome cost in mail pay, we recommend extensions. We also recommend that new certificates be granted for five years.

"We agree with the present CAB policy which favors limited competition among American operators on international routes. We do not approve the chosen-instrument policy.

"We recommend Congress appropriate each year the full amount of Federal funds permissible under the Federal Airport Act of 1946.

"Where a question arises as to whether airport facilities are constructed with the aid of Government funds or through the use of private capital, an investigation should be made by the CAB. If it is found that Government funds were used, steps should be taken to make these facilities available to all United States civil aircraft at reasonable rates.

GOVERNMENTAL ORGANIZATION

"We recommend that the Government executive functions relating to civil aviation remain under the direction of the Secretary of Commerce who shall have immediately under him a Secretary of Civil Aviation in charge of a Department of Civil Aviation. The position of Administrator of Civil Aeronautics should be abolished and the functions, activities, and duties of the Civil Aeronautics Administration transferred to the newly formed department. We recommend that there be set up parallel to the Secretary of Civil Aviation a Secretary of Industry and Trade who would supervise a Department of Industry and Trade within the Department of Commerce. This would parallel within the Department of Commerce the pattern recently set up in the military establishment. . . .

"The Civil Aeronautics Board should continue to be an independent agency, located within the Department of Civil Aviation for housekeeping purposes only. The membership of the Civil Aeronautics Board should be increased from five to seven in order that the practice of the Interstate Commerce Commission of operating by divisions may be adopted. The salary of Board members should be increased to $15,000 a year.

"The Secretary of Commerce should be a member of the National Security Council.

"The Secretary of Civil Aviation should be chairman of the Air Coordinating Committee." END

Pennsylvania Tackles the Flying Hoodlum

(*Continued from page* 15)

1947, 87 violations were thus investigated, resulting in 56 civilian arrests (54 pleaded guilty when confronted with the evidence), eight warnings, and a handful of military cases which were turned over to the services for action.

In addition, all accidents involving loss of life or damage of $100 or more were sifted by one of five experienced investigators. Their detailed reports are available to CAA and to CAB, whose own limited personnel must confine their civil non-air carrier accident activities to crashes that involve fire in the air, collision, or structural failure; and to crash injury research which operates under the auspices of the National Research Council. This latter agency analyzes details of injuries and structural damage to determine how to design safe airplanes.

When Anderson was first confronted with the tense post-war aircraft accident situation, his corrective plan was not greeted enthusiastically by other state officials. Only by long persuasion (and by recourse to law books which specifically indicate that the aeronautical code must be enforced as any other state law) was he able to obtain full co-operation from state departments.

Fortunately, funds were available from aviation gasoline tax receipts and Anderson was able to put his plan into effect shortly after he received the governor's approval.

With the aeronautics commission pledged to pay the salaries and expenses of men assigned by the state police, the commissioner of police requested each squadron commander in the four Pennsylvania police districts to recommend his best qualified man. The four men picked were trained investigators of from eight to 15 years' experience. A fifth man, Detective George Stedman from the Bureau of Criminal Investigation at the Harrisburg headquarters, was assigned to Anderson's office at the Harrisburg State Airport. Though all of the men were pilots, the job primarily called for skilled investigators. Both Anderson and Stedman emphasize that air investigation and enforcement is a ground police job and not a job for an aerial traffic cop. Frequent meetings were, and still are, held with representatives of CAA and CAB, airport operators and the various pilot organizations. The aviation investigators also appear before classes in flying schools and talk to student pilots *before* they have the opportunity to become violators.

This nucleus of five key men was given an intensive course in related aeronautical subjects with the co-operation of CAB and CAA legal, inspection and other experts. The men then returned to their squadrons to hold meetings and indoctrinate other squadron members.

Effects of all this were almost instant. Current complaints are now isolated and widespread in origin, generally involving new student and private pilots who think their newly-earned wings constitute a blanket approval to buzz the girl friend's house.

Terse files in Anderson's office tell an eloquent story. Reports are of two types: those in which the complaint was the result of a violation, and those in which the complaint was the result of a crash. Labeled "Report of Accident, or Violation of the Aeronautical Code of Regulations," these forms cover all points of interest to CAA. On the blank reverse sides appear the investigating officers' personal report covering six points: synopsis of violation, location of violation, statement of pilot, statement of disinterested witnesses, opinion of investigating officer, and prosecution.

The reports fall into a pattern. Sources of complaints, for example, are significant. So many of them come from troopers, even when they are off-duty, that it is obvious the ratio of one trooper to every two licensed aircraft is a potent factor in catching foolhardy flyers. Numerous complaints come from operators who now have some means of dealing with holier-than-thou pilots who raise hell in the next county. The more intelligent operators are quick to co-operate, for they don't have to be reminded that one piece of crazy flying destroys more confidence in aviation than can be built up in six months of good conduct. The co-operation of operators has been a major contribution to the success of enforcement.

The bulk of the buzz boys average 25 to 30 hours' total time. There can be no doubt that the overwhelming majority of relatively new pilots do not understand how you can get into fatal difficulties and, conversely, that present instruction methods leave much to be desired. The state leans over backwards to avoid even a tinge of persecution. Many warnings are given to persons who do not commit flagrant violations; but the genuine crazy characters are hit with everything in the book. If investigators are reluctant to believe straight-faced stories about forced landings it is usually because the girl friend or some relative lives near the scene of the accident or violation.

The investigating officers' opinions are a revelation. On May 2, 1947, an operator followed a private pilot in another plane and caught him red-handed buzzing a farm. "It is this officer's opinion," wrote the investigator, "that this was a deliberate violation of regulations. A surprise twist to this violation is the fact that this pilot's best friend was killed less than two weeks ago while buzzing his home. At his friend's funeral this particular pilot was heard to remark that if he ever flew again he would stay plenty high. Yet, the first time he flew a plane after this tragedy he flew low and recklessly in the vicinity of his friend's home. Apparently this warning had little effect on the pilot. . . . This farm is located in a hollow between two steep hills and there is no place, in the immediate vicinity, to land in case of an emergency." On the same day, this officer filed charges before a Justice of the Peace and the subject was fined $12.50 and costs of $2.25. It was strongly recommended that his license be suspended by the Civil Aeronautics Administration.

This report is comparatively mild. One, for example, lists the complainant as "nu-

Pilot Joe Marcinko tells why EVERY private flyer should be a member of AOPA

"I think all of you at the AOPA Headquarters have been doing a wonderful job. It seems that oftentimes not only the rights, but the existence of private pilots are at stake, and the AOPA is out there fighting all the time. Thank you for the prompt and courteous service I have often received."

From Joe R. Marcinko
AOPA Member Pilot No. 21818

AS Pilot Marcinko points out, the primary purpose of AOPA is to protect the interests of personal aviation, to develop its usefulness, to create a vigorous unified program for the continued advancement of private flying.

AOPA, with headquarters in Washington, is doing this job, and doing it well. It has become the largest organization of its kind in the world, and the recognized voice of private flying. AOPA has grown with private flying—and it is helping private flying to grow. It is aggressive in protecting the interests of private flying, and it is farseeing in its program for increased safety, greater usefulness, and less expense for private flyers and owners.

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merous residents." This private pilot stated that he flev a rented lightplane at 1,000 feet over his home town and suddenly discovered that he was down to 150 feet, following which he immediately climbed back to 1,000 feet and returned to the airport. But witnesses testified that he had been simulating forced landings on apartment house roof tops, narrowly missing chimneys, and scaring many people into their backyards for fear he would strike a house. He was fined $25 and $5 costs.

One of the worst jobs of buzzing was done over three northern Pennsylvania towns on Palm Sunday by a Naval Reserve pilot who had been cleared to practice in the Anacostia area. The complaints (two from troopers) and eye-witness statements on this flyer indicate that he interrupted services at four churches, causing the congregations to flee to the streets, showered limbs of low trees on porches, rattled dishes off the shelves, and, apparently, flew under a bridge. When the investigating officer's report reached this pilot's commanding officer he was summarily discharged from the Navy. Another student in a J-3 landed, filled the cockpit with corn, and strafed his neighbors so well that he forgot to fly the airplane and spun in. Another glided up behind a farmer and a team of horses, and blew the farmer's hat off by opening the throttle. Fortunately, Pennsylvania's highly effective police work has reduced such cases to a mere handful.

What is most amazing—and this will interest budding buzzers—is that in every instance the plane has been identified. So many persons witness the flights that license numbers, color schemes, and frequently both the designation and model of plane are reported. Several times, damning pictures have been taken from the streets. Frequently, the pilot is recognized.

Fatal accidents are investigated with exacting care. Each of the regional investigators is equipped with a camera with a flash attachment, and a tape measure. The investigator thoroughly covers the scene of the crash, all of the injuries (regardless of what caused death), details of structural damage, and gives his own analysis of the accident. On the back of one report is a detailed account of the collapse of the nose section and the injuries to the pilot, vital information for Crash Injury Research. Anderson states that CIR is most interested in bad crashes from which the pilot walks away, or in minor crack-ups in which the pilot is killed.

From January to June, 1947, 99 accidents were investigated, 91 of which were civilian. Of the latter, 16 resulted in fatalities, five of which were blamed on low and reckless flying.

While the Pennsylvania program is making a major contribution to safe flying, its efforts, actually, are only half measures. To be fully effective, the states need additional enforcement authority from Congress. At present, the state can do no more than levy a fine and recommend suspension or revocation of the pilot's certificate. The guilty pilot now is able to resume flying—or to fly in another state. The CAA mill grinds slowly on such action, as it does in supplying information on registrations. Through voluntary assistance of the operators the state is able to keep its own up-to-date file on about 75 per cent of the planes flying within its borders. But even though CAA is unable to deal with wild and woolly flying, it opposes delegation of such authority to the states. CAB, on the other hand, is keenly interested in the possibilities and effectiveness of state investigation and enforcement. With full authority to act, the state would not be plagued by cases like this one:

During a moderate snow storm with a 300-foot ceiling and ⅜-mile visibility, a pilot flew contact through mountainous country into the Harrisburg State Airport without contact with the tower. Though he carried a passenger, the plane did not have an airworthiness certificate. The pilot's license was invalid, and the pilot was not familiar with regulations. The same man maintained an unlicensed, unsafe landing area. Later, it developed that he had stopped a ball game for 15 minutes while he did aerobatics at various altitudes down to 80 feet. In the opinion of the investigating officer, the pilot "has a very bad reputation for being a low and reckless flyer, and most people feel that sooner or later he will kill himself. This pilot is very cocky and feels, because of his 2,300 flying hours, that he can handle a plane at any altitude." When the officer apprehended him, the pilot bragged that nothing could be done about his license. Total fines of $191.27 did not change his opinion.

Even without authority to confiscate a pilot's license, however, the Pennsylvania Aeronautics Commission has proved that low and reckless flying can be brought to a virtual standstill and that simple enforcement of regulations can make flying appreciably safer. END

Watchdog in the Cockpit

(*Continued from page* 30)

reassuring "bull's-eye" or safety circle denoting "all-clear ahead." However, bright splotch-like patterns followed by black "no signal" areas and a smear of light across the safety circle means that a towering ridge looms not far ahead at flight level. This warning gives the pilot ample time to turn or climb the plane until the dark again appears unblemished.

The scope is easily read, even by the novice pilot.

James Ray, recently resigned as vice-president in charge of operations for Southwest, says they have been testing the Allison set as a possible substitute for standard radio range stations when used in combination with a high frequency CW (continuous wave) beacon. American Airlines previously had tested airborne radar in this connection. With its *Flagship Alpha*, AA made more than 600 successful low approaches with the pilot either "under the hood" or flying under actual instrument conditions.

CW beacons could be placed at the ends of runways, giving what Ray believes might be as much safety as if radio range stations were placed along routes. At present, feeder lines operate mainly under contact conditions because they lack range stations, which the CAA is reluctant to install since the operators hold only three-year temporary permits.

If CW beacons were mounted on a runway, the pilot of a radar-equipped plane could read the true compass heading of his scope from a line extending across it from its center point. The pilot could change course until the beacon was "dead ahead" and then fly straight down it. Meanwhile he could "read" the radar screen for altitude, wind drift and the location of obstacles in his let-down path.

Tests are in final stages, and if successful, Southwest plans to ask the CAA to lower minimum ceilings to as little as 300 feet and one mile visibility at certain intermediate airports on its route where there are no range stations.

The Allison set has a strong sensitivity to storm areas, which the testing airline likes. Rain storms and heavy cold front formations show up clearly on the scope, enabling the pilot to fly around, over or under such areas.

After the tests, Southwest has an option to buy the first 10 Allison sets produced. The set per unit costs $8,000 now but it is expected the price can be greatly reduced under mass production.

Aviation Maintenance Corporation, Van Nuys, Calif., installed the sets in the DC-3s. Officials say one of the best features is ease of installation.

Smallness of the set reduces modification work on the plane to a minimum. The scanner is in the nose, connected by two 17-inch cables to the viewing screen.

Fabrication of a new nose piece and the addition of channel brackets to support the scanning unit is the main job. Lower half of the nose is made of Plexiglas and the upper is conventional alclad skin. The latter is easily removed for maintenance accessibility. There are no radar exterior "blisters" to create additional drag.

The Allison Radar and Equipment Company says that for larger planes with wider cockpits, two scopes could be used —one for each pilot—with increased weight of only eight pounds.

One difficulty which confronts the Allison set is that when the plane's nose is up or down the scanner points as the nose does, instead of staying steady with the distant horizon. American Airlines, meanwhile, is working with General Electric Company to produce a similar radar unit but one in which the scanner is gyro-stabilized. This set will weigh, complete, about 100 pounds.

Allison reports his company will start production this spring. It also is possible, he said, that a plan may be worked out to lease the sets to airlines and others for six months at $500 per month.

This plan is being considered because, at $8,000 or more per unit, complete reconversion would place a heavy financial burden upon airlines with from 50 to 100 or more planes. END

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How to Buy a Used Plane

(*Continued from page 20*)

While the law requires that planes be safe to fly, it does not guarantee that a licensed plane will not need extensive maintenance a couple of months after purchase.

A pilot can keep from being stung by not being over-eager, by doing as much personal checking as possible and by getting a mechanic to look the plane over. It's good to read classified advertisements in aviation publications for an idea on asking prices. While condition and extra equipment are often the reasons for a higher price tag on one of two similar planes, the difference also depends on the seller's own valuation of his plane and is not necessarily the going market value.

For a realistic picture of what to look for when buying a used plane, FLYING accompanied a typical prospect around a "used plane lot." Westchester Airport at Armonk, N. Y., recently set aside an outdoor storage area that will accommodate up to 150 used personal planes. Airport Operator J. David Finger has offered free storage space at the field for planes that are for sale, with the airport acting as agent. The airport inspects and appraises the planes and lists them in its trade circulars and advertising, charging a fee of 10 per cent of the purchase price. In cases where the seller's price is higher than the airport appraisal, it is handled at the seller's price for a short while if he insists, but if it is not sold within a stated period the plane is withdrawn or the price is compromised. Since the size of the airport's percentage fee is tempered by price and quick turnover, Finger believes that his airport system will result in more sales and more reasonable prices.

Richard Green of Armonk had read the ads and had a fairly good idea of what he wanted: A two-place all-metal job, or possibly—if the price were right, a four-placer. He recently drove out to Westchester Airport and looked up the airport sales manager, Joseph T. Barta.

Barta took Green into the airport lounge and showed him lists of planes for sale. In the two place category, the airport had a practically new Globe *Swift* for $3,000, and a Cessna 140, recently relicensed with 190 hours total time, two-way radio, all-metal prop and other extras, priced at $2,300. A Stinson 150, once used by a petroleum company for cross-country flights only, was also on the field. It was a 1946 model with 190 hours total time, re-licensed a month previously, and priced at $4,000. Equipment included a complete blind flight group, all factory-installed instruments, an Aeromatic propeller—and the plane was exceptionally clean. For a little more money ($5,000), Barta had a 1947 Stinson 165 with only 80 hours.

Green read over several of the log books, comparing the histories of the planes. Books, of course, aren't conclusive proof of anything but they aid in sizing up past care. The company Stinson even had ground run-up time listed against the engine. Green knew that if an engine is close to a required top or major overhaul, that fact should be reflected in the asking price. Also, if an engine has a troubled past, probably it will have an expensive future. According to the log books, no accidents were listed for any of the craft and all inspections were pulled on time. Green was definitely interested in the Cessna 140 and Stinson 150, with the four-placer in the lead.

Down in front of the main hangar the two men walked around the latter two planes, which had been moved into the clear by mechanics.

First item they checked at close range was the propeller. If the finish is deteriorating or if deep nicks are present in the blade sheath or on any of the surfaces, the prop will need reconditioning soon. The more expensive controllable propellers give better engine performance over all ranges than the fixed-pitch, but they should be checked for blade looseness and free travel. Barta called these facts to Green's attention, pointing out the thin blade shank and clean design of the metal prop on the Cessna, and demonstrating the movement of the Aeromatic blades on the Stinson.

Next, they checked the engine cowling and engine itself. Cowling should be examined for missing fasteners, sprung rivets, small cracks and good fit. The engine should be clean, with no rust or corrosion spotting on the cylinders. Check the accessory section for evidence of oil leaks and take a good look at the engine section for leaks immediately after the demonstration flight. All hoses should have a minimum of checking due to the weather, and clamps should not be cutting deeply. Copper and aluminum lines should be examined for cuts, chafing marks and oversharp bends. The customer should always ask for a valid explanation, credit or replacement for any part that appears defective.

Green was curious about the spring action of the vanadium steel gear on the Cessna, so Joe Barta pulled down on the wing to demonstrate that even when standing still the entire plane and gear flex easily with the movement. Tires and wheels came in for a quick check. The tires should not be badly worn, scuffed, cut or cracked by the weather. Wheels and brake assembly parts must be clean so they can be inspected for possible rust, cracks or other defects.

The buyer doesn't have to be a mechanic to satisfy himself as to the aircraft's obvious condition. Common-sense and take-it-easy questioning can be the order of the day. He doesn't have to worry about being thought finicky for his likes and dislikes and, if he's careful enough and drives a sharp bargain, he'll save money—the important reason he's buying a used plane.

The wings should be checked for cuts in the leading edges, presence and security of all inspection plates, loose tape on fabric-covered surfaces and sprung rivets on the all-metal jobs. Any patches, no matter how old, call for an explanation and inspection to see that they are still secure. Cabin doors must open easily and latch securely and all hinges require a check to make sure that they have not loosened or twisted from possible previous forcing of the doors.

Any defects found on used planes do not call for rejection of the airplanes. The defects may already be reflected in a lowered price, but evidence of over-all deterioration or carelessness in the previous upkeep calls for strict care before buying.

Fabric-covered planes require a careful inspection of all surfaces for condition of the finish. Checking or cracking are signs that refurbishing will soon be necessary, but the best test is to apply moderate thumb pressure to the surface in question. If no sharp cracks appear during the test the finish is still in good condition.

Before going any further with the examination, it's a good idea to take a quick

USED PLANE BUYER'S CHECK LIST

The following list includes items which should be checked by the used plane purchaser previous to turning plane over to a licensed mechanic for an inspection, preferably a 100 hour check.

TYPE OF PLANE

MODEL

TOTAL TIME

LOGBOOK

NEXT REQUIRED OVERHAUL?

ACCIDENTS?

COMPLIANCE WITH CAA CIRCULARS
- Care of engine
- Care of plane

GENERAL APPEARANCE

PROPELLER
- Finish
- Blade sheath
- Looseness?
- Free travel?

COWLING
- Missing fasteners?
- Sprung rivets?
- Cracks?
- Good fit?

ENGINE
- Cylinder rust, corrosion?
- Evidence of oil leaks?
- Checking on hose?
- Clamps cutting?
- Copper lines (cutting?, chafing?, sharp bends?)

WINGS
- Cuts in leading edge?
- Inspection plates present?
- Loose tape on fabric planes?
- Sprung rivets on metal planes?

CABIN DOORS
- Open easily?
- Latch securely?
- Loose or twisted hinges?

CABIN INTERIOR
- Upholstery
- Instrumentation

FABRIC COVERED PLANES
- Condition of finish?
- Cracking?
- Checking?

CONFORMANCE WITH MANUFACTURER'S SPECIFICATIONS
- (Should be checked on demonstration flight.)

look at the cabin interior. Some buyers have a bad habit of going through the whole routine of assessing a plane, taking a demonstration flight, and then deciding that the upholstery is shot and the instrumentation isn't as complete as represented.

After Green completed his own comparatively superficial inspection in the company of Joe Barta and began to feel that the Stinson might be the cookie for him, Barta asked one of the airport mechanics to give the craft a more complete inspection. Some shoppers bring an outside mechanic with them. While this is a good policy, actually any mechanic at a reputable airport who signs an inspection slip certifying that a craft is in good mechanical condition is putting his own license and reputation on the line.

The mechanic should go over the plane from the nose to the tail, removing cowling and inspection plates wherever necessary and explaining to the buyer the reason for each check, from carburetor controls to the tail wheel assembly. After the plane has been re-cowled and has been signed for as being in the represented condition, it's time for a demonstration flight, the one item in the whole routine of buying any airplane that should never be omitted before a final decision is reached.

The flight test should prove that the craft performs approximately according to the factory specifications for that type. All instruments, and any special equipment such as a radio, should be in top working order and, again, exactly as stated by the seller. If a plane needs reworking or maintenance before a deal is closed many pilots list fully, by type and manufacture, all the instruments and accessories in the plane at the time of the demonstration to insure that no substitutions are made before actual delivery.

The last step before taking over the plane is getting the bill of sale or an option to buy. The same elementary rules of business that prevail in signing any kind of agreement or contract hold true here. Any work that has to be performed before the transfer of money for the plane should be itemized; any deductions should be thrashed out before signing up.

As far as taking out insurance on the plane is concerned, many pilots find for the first time that the plane itself becomes a minor consideration. Frequently, insurance company inspectors are unable to perform their usual semi-annual inspection until months after the plane has been bought. The primary consideration of most insurance companies in personal plane coverage is the past flying record of the pilot, rather than the airplane, and in many cases, no matter how perfect an airplane may be, insurance coverage is refused. When insurance is written, however, the value of the plane is considered and that is the reason that the used plane is less costly to insure.

The most important point to remember about shopping for a used plane is that no matter how big a bargain it may seem, the pilot must be able to afford to keep it up. An aircraft that is expensive to operate cancels out all the savings represented by the low initial cost. As obvious as it appears, some pilots forget that maintenance costs on a used plane may be slightly higher than on a new plane because, depending on age, parts will need replacement on an accelerated basis.

As an old horse trader used to say, "I keep my common sense in the same pocket with my money—one keeps me from losing the other." END

Danger on the Airport

(Continued from page 23)

der is hitting a wing tip, and while a streamlined automobile performs very nicely with a banged-up fender, the aerodynamics of an aircraft just won't hold still for that sort of thing. A broken landing gear or a bent prop means a lot of nice new parts, plus the cost of labor.

Admitting that how you go about rolling around the airport is relatively unimportant, let's not conclude that it isn't important at all. Ask the airlines. Airline pilots know how to taxi. But in any given year, with the help of eager mechanics, they manage to get tangled up in a fancy assortment of ground gremlins. Commercial carriers bump into trucks, baggage stands, passenger ramps, lamp posts, commissary carts, parked planes and even concrete mixers. One airliner struck an unlighted sawhorse with its right prop and another taxied

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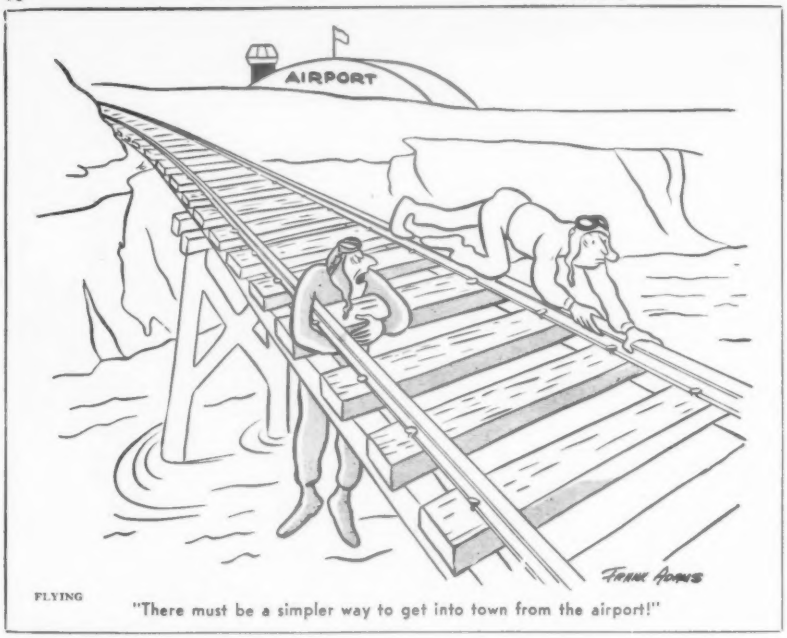

"There must be a simpler way to get into town from the airport!"

into a hole which the Civil Aeronautics board concluded to be the work of a small but diabolically clever "burrowing animal." Just to even things up, truck drivers made it an occasional courtesy to back into an elevator, a propeller blade, a wing, or a fuselage. These are all either minor accidents or what are officially referred to as airline "mishaps." Only mishaps, to be sure, but the cost of a wing tip includes the cost of keeping an airplane on the ground which ought to be in the air.

Private flyers have the same earthly troubles, only more of them. In the past five years they have been involved in thousands of major taxiing accidents and a good many minor accidents and mishaps as well. Roughly, one out of every seven private plane accidents occurs during taxiing. A large number of other ground accidents occur on the landing roll or during the take-off run. During take-off there are collisions with boundary markers, rocks, embankments, parked aircraft, fences, and underbrush. And many take-offs are unsuccessful because of snow-covered runways, soggy ground, soft dirt, ruts, and ice.

During the war the AAF, quite naturally, had more airport troubles than all the rest of the winged clan put together. Hastily built airports, traffic congestion and inexperienced personnel combined to make the going tough. During the peak of AAF activity, in the first half of 1944, a survey was made of 550 major accidents resulting from poor design or maintenance of the airport. The Army wanted to know what it was that caused airplanes to lose their military bearing as soon as they felt their wheels supposedly safe on the ground.

The accidents studied involved nearly 600 aircraft on 340 airports. The biggest factor was found to be soft ground at the edges and ends of runways and along the taxi strips. One out of every four major airport troubles was attributed to this cause—more than twice the number of accidents in any other category. Usually a nose-up or nose-over was the result, or a broken landing gear. Of the 230 airports which replied to the question: "Are runway shoulders soft?" 63 answered "yes," and 25 others reported "yes" in wet weather.

Sodded or sandy fields having no paved runways were the second most frequent cause of accidents attributed to the airport. The nearly 100 accidents resulting from these conditions often occurred when the ground had become waterlogged and soggy after a rain, and when wet grass prevented proper braking of the aircraft. But of nearly equal frequency were accidents in dry weather caused by excessive dust and loose stones. These numerous accidents on unpaved airports provide an important warning to the lightplane operator.

About one-third of all airports are the small Class I ports which can get along without paved runways, and the present National Airport Plan places major emphasis on these facilities designed for lightplanes. New airport facilities must be properly designed for safety, with stabilized shoulders, adequate drainage, closed ditches, and freedom from dust and mud.

Snow on the airport was a constant winter hazard in Air Force operations, just as it always has been in commercial and private flying. In January and February hardly a day passed without one or more serious accidents resulting from skidding on snowy or icy runways, or from running into snow banks on the edge or at the end of the runway. These accidents were very frequent where the accumulation of snow left by the airport plows was a constant collision hazard. The problem of getting the snow back far enough off the traveled ways to give aircraft a clear landing path caused some airports to try rolling and packing the snow rather than plowing it. But final recourse to heated runways to avoid the whole problem may be the only ideally successful way of coping with ice and snow.

In addition to these accidents attributed to the airport itself, another 100 AAF accidents per month were occurring in the U. S. because of collisions on the airport between two or more aircraft, or between aircraft and motor vehicles or other impedimenta. Collisions between moving aircraft occurred either because pilots didn't see each other or because they misjudged distances or took their brakes too seriously. Another favorite was bumping into parked aircraft. This was often due to the fact that one or more planes in an otherwise even parked row would be sticking out into the taxi lane just far enough to get hit. Or it might result from the moving aircraft attempting to squeeze into a crowded place without the guidance of ground crews. These collisions often involved several military planes at a time and were a source of considerable damage and high-ranking displeasure.

Collisions with equipment left on or near the runways included tool boxes, energizers, barrels, fire extinguishers, and other misplaced paraphernalia. The fact that most of the training and small tactical planes used in the war were as blind as bats provided the necessary setting for getting tangled up in this miscellany.

There are two principal factors which can be expected to make for more confusion on the ground in the future. One is the increasing congestion resulting from more and more airplane traffic. There are now about 100,000 civil aircraft registered in the United States, which is already more than triple the pre-war number. A second factor is the variety of sizes and operating characteristics of these planes, and the consequent possibility of collisions because of the increased difficulty of judging wing spread, and of taking into account differences in speed and maneuverability.

What can be done, then, to reduce the confusion on today's airports to something short of the present humiliations being suffered by airplanes and pilots?

As in every other accident problem, you can be sure there isn't any single remedy. Good maintenance of the airport is the first thing that will bring results. Fixed obstructions should be removed, temporary hazards should be properly marked, adequate ice control and snow removal methods should be adopted, dust palliatives should be employed, shoulders should be rolled and stabilized, and objects inviting collision should not be left on the taxiways and ramps. Those items are elementary.

In addition to good maintenance, better traffic control is also in order. Airport traffic control is still in the traffic cop stage, only the cop is in the tower instead of at the intersection and he is supposed to see everything that is happening, or about to happen, along several mile-long runways, on the taxiways and ramps, and in the adjacent heavens. And the control tower operator can't blow a whistle and ask everyone to stop while he figures things out. The traffic problem on the

airport also encompasses other vehicles than aircraft, especially maintenance equipment, loading vehicles, and fuel trucks. These must be controlled as well as the vehicles with wings.

The combination of good maintenance and efficient operation, together with strict discipline among pilots and ground crews, is probably the best way to meet the ground accident situation. Most important, unless the pilot exercises every care, there isn't much use complaining about the other things. He can always find something to hit if he doesn't look for it hard enough.

But for the future, two other possibilities are also high on the reform list. First, an airplane should be designed to permit the pilot to *see where he's going.* That is being done in many cases by adopting tricycle landing gear which lets the pilot see ahead; and by designing canopies which provide 360° of unrestricted sightseeing. Another laudable aircraft characteristic is to be able to stop after you see something in your way without finding out too late that the brakes won't work, or that they work well enough to land you on your nose.

Second, the airport needs to be designed with something more than the length of runways in mind. The soft shoulder and the open ditch are cast-offs from the early road-building days. And the number of runway intersections inviting collisions on an airport doesn't look like very smart planning. Just as the first automobiles carried a whip socket in memory of the passing horse, airport designers have adopted most of the characteristics of the highway, apparently to make the ex-autoist feel at home.

The airport, of course, is really the pilot's home. Those 5,000 dots on the air map are the only places he can be coming from or heading toward. That's why an airplane should be as much at ease on the ground as it is in the air. But so far the common ordinary pigeon still has us licked. He may not fly a whole lot better, but he sure gets around more gracefully on his feet. END

Use a Bank Indicator

(*Continued from page* 32)

a fine indicator of pilot *feel* and flying sense; a pilot who skids his turns is employing dangerous technique and anyone who doubts this fact is cordially invited to review the shocking number of accidents caused by stalls in steep turns.

The bank indicator is a device which shows whether there is sufficient bank for the rate of turn. Figures 1 and 2 indicate the resultant component of gravity and centrifugal force in a slipping turn and a skidding turn.

In Figure 1 the plane is banked too steeply and the result is a slip. That is, the mass is drawn downward by gravity more than it is thrown outward by centrifugal force. In a perfect turn the resultant of gravity and centrifugal force is acting in a direction perpendicular to the wing.

In a slip, all objects will "lean" or "fall" toward the inside (low side) of the turn. If we were to hang a steel ball on one

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end of a chain and tie the other end to the instrument panel, the steel ball would also "lean" toward the low wing, indicating that the bank was too great for the turn.

Thus we have a home-made bank, or skid-slip indicator. The same contrivance may be purchased for a few dollars in the form of a bank indicator. The steel ball is contained in a glass tube which is curved in a 20° arc. The tube is filled with fluid to dampen the movement of the ball, sealed at each end, and mounted on the instrument panel of the plane. When it is mounted, care must be taken that the wings are level, or the indicator will show a false slip in level flight according to the cant of the wing during the installation of the bank indicator.

Another word of caution: Several kinds of bank indicators are available and care should be taken to purchase one with only approximately ten° on each side of the center, or "cage." A 30° indicator will be of little value, because a few degrees of slip will not move the ball enough to be plainly visible.

To prevent undue watching of the instrument, some pilots paste a flap of paper above the ball, so that it hangs down and obscures the indicator. Then when the plane is banked and the turn is established, they raise the flap, check their coordination, and make corrections accordingly.

The correction is quite simple. Some pilots like to assume that they "lift" the ball. Suppose the ball is on the low side, in a right turn, indicating a "slip." In this case the plane is banked too steeply for the turn, so they "lift" the ball up by pressing left stick, removing some bank.

Another method, much easier to remember, is to "rudder the ball." Thus in a right slipping turn with the ball on the low, or right side, the rule of ruddering the ball would require bottom, or right rudder. This brings the nose around into the turn, the rate of turn increases, and the ball moves back to the center of the indicator.

The same reasoning holds for a skidding turn. Suppose the plane is in a left skidding turn, with the ball on the right, or high side of the indicator. The simple rule, "rudder the ball," will demand that the pilot apply top, or right rudder. This decreases the rate of turn by swinging the nose outward and the ball returns to the center of the indicator.

Another joker is the sticking ball. This occurs from long use and vibration, which causes a pit to form beneath the ball.

Another error is the improperly-mounted indicator. It must be mounted with the wings perfectly horizontal. A spirit level is necessary to check this. Then the indicator may be installed, with the ball exactly on the zero or center line.

When the day comes for flight test and a very tough inspector gets into the plane, have no fear! If you can coordinate for yourself in turns, eights, or pylons, you know that at last you've gained the feel of your plane; and if you can coordinate in those maneuvers you can do the same good job for any inspector. A smooth (or coordinated) pilot has the feel of his plane.

And when you can swing the plane across the sky in giant S turns or coordination maneuvers and watch that ball stay perfectly still, you'll experience the keen satisfaction of the artist who has mastered his trade—but be sure that *your* indicator isn't stuck! END

The Ryan Navion

(*Continued from page* 40)

an excellent job of soundproofing the airplane (North American *Navions* are a good deal noisier). And the excellent job of upholstering, carpeting and painting has done wonders for this plane.

As I said in the January, 1947, issue, the *Navion* is an ideal modern airplane for the ham-handed amateur. *Ercoupe* pilots, particularly, take to this airplane instantly. And except for the multitude of knobs and switches which apparently will always be with us in an airplane with retractable gear and flaps, the *Navion* is as easy to fly as an *Ercoupe*—easier if you appreciate the value of the *Navion's* excellent flap.

The contrast in flying to San Diego in an old *Navion*, then flying a new one immediately after landing at the Ryan plant, was striking. The Ryan *Navion*, being basically the same as its predecessors, has about the same performance. I made several take-offs into an 11 m.p.h. wind and, depending on how carefully I flew the ship, was off the ground in six to 10 seconds from a standing start. Rate of climb from sea level still is over

800 f.p.m. Cruising speed at about 2,100 r.p.m. is about 140 m.p.h., I found—although Ryan insists that, "if the airplane is properly flown" it will cruise at 150 m.p.h.

It takes practice to get the *Navion* trimmed down to its best cruising attitude. You must keep trimming forward until you think the airplane is diving. That little trick takes several hours for the average pilot to master—and it costs him several miles an hour until he does.

The Ryan *Navion* I flew for this article (NC-4143K) trimmed up beautifully in the air. The air was smooth and, after a few moments of adjusting the trim tab, I got the plane into level flight. Then I took hands and feet off the controls and the airplane flew itself for some time without the altimeter changing 10 feet.

I suppose the most dangerous thing an amateur pilot can do is to slow an airplane down to stalling speed, close to the ground, in a turn—and then pull up the nose. Many an accident statistic has been written around that situation. So I tried it (but at 3,000 feet). I slowed the airplane down, dropped gear and flaps, made a steep turn, then pulled the nose up hard. The airspeed dropped to around 60 m.p.h. and I pulled the wheel back as far as it would go. The airplane just held its turn, settled slowly, and that's all. I have flown many airplanes I'd never dare put in that predicament.

As I said over a year ago, the *Navion* is almost in a class by itself at slow speeds. I maintained altitude at about 60 m.p.h., holding about 1,700 r.p.m. I stalled it with flaps and gear up at 60 indicated. With the gear down it stalled at 55, and with gear and flaps down, it stalled at about 47 m.p.h. indicated.

An airplane that can perform like that can make even the most fumbling pilot look good. That is one of the *Navion's* greatest assets; it flatters even the most inexperienced pilot. All any pilot need do is point the airplane, open or close the throttle and lower the landing gear, and the *Navion* will do the rest.

Landing the *Navion* still is one of the most fascinating bits of simple trickery I've ever done in an airplane. You can fly it around the traffic pattern just like you do any other airplane—but you'd better leave the flaps up until you're almost over the runway. Or you can fly around the pattern as high as 2,000 feet above the field and still do spot landings well within the limits of the runway.

All told, Ryan has added some excellent selling points to the already-attractive *Navion*. In addition to the improvements in the plane's eye- and ear-appeal, there have been mechanical improvements too. The ventilation system has been redesigned. A 20-gallon auxiliary fuel tank has been added as optional equipment, boosting the *Navion's* range to 750 miles maximum. The entire fuel system has been redesigned and an electrically-driven fuel pump has been added as a safety feature.

A dangerous shortcoming in the system of interconnected fuel tanks also has been remedied. Older *Navions* could be refuelled to what appeared to be maximum capacity, only to find later that the tanks actually were some three gallons short. The error was due to the fact that the interconnected tanks had to be filled slowly or they would overflow, appearing to be full when they weren't.

Ryan now offers a choice of four colors: oxford maroon, zircon green and chevron blue, all with cream striping; and Catalina tan with cadmium red trim.

Basically, Ryan has made no changes in the *Navion's* instrument panel; the knobs and buttons are all in the same places. That layout could be improved upon—and probably will be when future refinements are planned. The carburetor heat control, for example, is right next to the mixture control—and I've come close to pulling the wrong knob during a landing approach. The landing gear lever is right beside the flap handle, although the former has a safety lock that prevents accidental gear-retraction.

When Ryan took over the *Navion* program, they sent every *Navion* owner a letter, asking him to list the things he found wrong with the airplane. The list of complaints boiled down to these: do something about the persistent fuel-pump troubles, fix the ventilating system, do something about the noise, change that refuelling system, and stop the oil leaks in the propeller mechanism. Ryan went to work on all these, and changes are incorporated in their new *Navion*.

RYAN NAVION
Type Certificate No. 782
One 185-h.p. air-cooled Continental engine.

Wing span	33 ft. 4½ in.
Length	27 ft. 3 in.
Height	8 ft. 6¼ in.
Gross weight	2,750 pounds
Empty weight	1,680 pounds
Maximum speed	157 m.p.h.
Cruising speed (3,500 feet @ 70% h.p.)	150 m.p.h.
Landing speed (with flaps)	54 m.p.h.
Maximum normal range	500 miles
Service ceiling	15,600 feet
Rate of climb (sea level)	830 f.p.m.

Source: Ryan Aeronautical Company

Except for these few shortcomings, though, the Ryan *Navion* is an ideal airplane for the man who wants a modern personal plane that is easy to fly, has the maximum in safety, has room to spare in the cabin, and is about as rugged as any personal plane flying. It is ideal for operating into and out of bad fields, and is doing much to disprove the diehard's notion that a tricycle-geared airplane is safe on hard-surfaced runways only. The *Navion's* nose wheel, for example, is almost as rugged as the main wheels themselves.

Visibility on the ground and in the air is excellent. Taxiing is extremely simple, thanks to that visibility and to the steerable nose wheel which is operated by the rudder pedals. Unlike other airplanes, the *Navion's* brakes are not on the rudder pedals. The two main wheels are braked by a long handle between the two front seats.

If you can afford about $9,000 for an airplane, the Ryan *Navion* should be high on your list of prospective buys.

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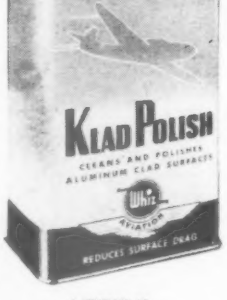

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Magic Airway

(*Continued from page 29*)

4. Incorporate an automatic *moving* block signal from plane to plane (railroads use a *stationary* block system), showing the pilot if another aircraft is ahead of or behind him, and even if other tracks into which he may wish to move, are clear.

5. Free the pilot from all navigational computation, with all necessary information automatically and errorlessly tabulated, although the pilot may at any time communicate by voice with the command post.

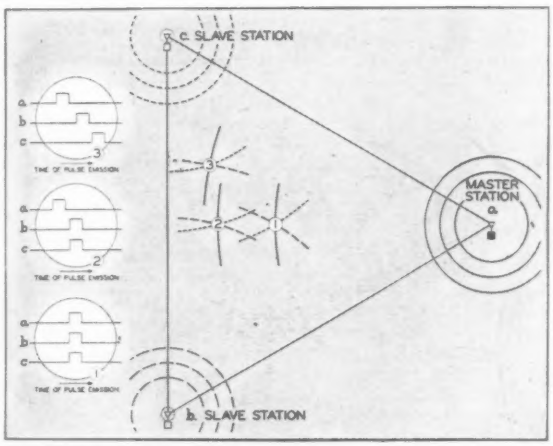
6. Aid the private pilot indirectly by freeing ground personnel from duties with commercial craft, enabling them to give the private flyer more attention. Airborne instruments will be available to private owners but at this early stage appear to be expensive although relatively lightweight.

7. Give high accuracy through all weather on tracks separated at two-mile intervals, with the greatest possible lateral error being plus or minus 500 feet.

The name Tricon is derived from TRIple COincidence Navigation. The system is based on the concept of three transmitted pulses which intersect to define a point in space.

Transmitted radio signals are intercepted, interpreted and acted upon by automatic electronic receiving, transmitting and measuring equipment, both in the airplane and at ground stations—giving both pilot and ground readers the desired information almost instantaneously.

Stations transmitting these radio pulse signals are situated



Triple coincidence is illustrated by proposed Tricon layout. At Station 3, no pulses coincide; at Station 2, two coincide, and at Station 1, along the Tricon airway, all three coincide.

at the extremes of an approximately equilateral triangle. The triangle covers a 50-mile section. A series of sections constituting a particular route can criss-cross the nation or run for shorter distances. Radio spectrum economy is claimed, since complete coverage of the United States can be obtained with a total bandwidth of about six megacycles, and cannot be saturated by traffic density. Present CAA plans, on the other hand, call for the use of about 200 megacycles.

The electronic airways tracks are established by synchronizing, varying and timing these pulses, which may be sent out at the rate of many thousand per second.

The pulse counters in the airplane will respond only when the pulses from all three radio stations coincide—that is, arrive simultaneously. They are then said to be in "triple coincidence," hence the name Tricon. The pulses can be timed to coincide at points which can be preset to form an airway. The airplane flies from each such point to the next, and thus follows the airway perfectly. The airway continues along the 50-mile block and is picked up and renewed in all subsequent blocks.

When the airplane is off the track, instruments in the plane measure and time the difference in the pulses and indicate the deviation on the instrument panel.

Tricon's measurements are made possible through the use

of instruments never before used in aviation—impulse timers and counters used in the field of nuclear physics and cosmic ray research.

The amazing Dr. Alvarez was able to work out Tricon because of his familiarity with such instruments in his duties at the Radiation Laboratory of the University of California. An advantage of his system is that no new instruments have to be invented, discovered or devised to make it operable—they already are in existence and are used in various scientific fields. It is just a matter of "putting them together."

As a traffic control system, Tricon includes pulse "communication" channels linking aircraft to adjacent aircraft, aircraft to ground control points, and ground to individual aircraft. These channels are used to provide automatic air-to-ground reporting of position and altitude, identification, moving block air safety facilities, and ground to air command communication.

In addition to the triple coincidence detectors, counting timers and track and distance indicators used for airway navigation, airborne Tricon equipment incorporates a pulse modulated transmitter which operates on a separate command and control channel, a pulse communication receiver which receives signals on this same frequency, together with the requisite altitude and identity coding circuits, and command and block warning decoding circuits. This equipment will convey numerous fixed or predetermined commands or inquiries, identifications or altitude indications.

Ground installations incorporate equipment which complements airborne equipment, receiving the altitude and identity transmissions from every plane, and an automatic display board which gives the location, identity and progression of all aircraft on the airway.

Command signals from the ground are available only to the particular aircraft for which they are intended, due to their relationship in timing to the triple coincidence just received—the precious missing key Dr. Alvarez worked out on his two-hour plane trip. This was the main piece of the jig-saw puzzle around which all the other components of Tricon fell into place during the period of four short days.

An aircraft's control receiver goes to work immediately after it receives a triple coincidence in the navigational unit and at the same time its pulsed transmitter sends out a series of pulses which identify the plane. These can be received only in planes within seven miles ahead or behind, and by the ground stations. The automatic aerial block system is thus established.

In brief, traffic control is performed by means of coded pulses which send information air-to-air, air-to-ground, and ground-to-air. Air-to-air block signal information is for safety purposes, air-to-ground information gives the ground controller a complete picture of the air traffic, and ground-to-air information allows traffic control procedures to be put into effect. Traffic control information is reg-

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ulated by the triple coincidences which provide navigation information, thus integrating the two functions.

How position and command information is given to the pilot is one of the most interesting functions of the new system. It's all set right before him in a compact instrument box, which he can read and interpret with a minimum of mental effort.

On the proposed panel, at the top, is a left-right meter to give him lateral deviation from the center of his electronic track. The needle is centered when he is on true course.

Below this meter is a row of lights, each indicating the lanes of the airway. Whenever the plane is on a particular chosen or assigned path, the light above its track number will glow.

An airway number indicator of the particular block in which the plane is flying also is included, as is a vertical position indicator, and an odometer which clicks off the ground distance traveled in the section or, alternatively, the distance to go in the particular section.

Below these are two large lights, one green to indicate the track is clear in the block, and the other red, which *flashes* on when another plane is overtaking the plane at the same altitude and in the same track. The light burns *steadily* when the plane is overtaking another dead ahead. Between these lights are four push-buttons which enable the pilot to examine the tracks to his right, left, or above and below, or determine if they are clear. The block light will glow red if the track the pilot examines is occupied, or if it has been assigned to another aircraft. Below these lights is a knob to control the length of the warning block.

To the pilot's right on the panel are a row of lights which flash as commands are received from the ground, such as "hold," "listen," "go down," "go up," "obstacle," "go left," "go right," etc. These orders also could be duplicated by voice.

The left-right indicator can be hooked up with an automatic pilot for automatic flight along the path, in holding paths and during turns.

It is emphasized that Tricon is not a system for landing aircraft, but it's navigational and traffic control facilities can channel it into the landing areas in the proper heading and at its proper point for taking over by GCA or ILS systems.

Information received on the ground is automatic and includes aircraft identification or flight numbers, its position and altitude, its course, or flight direction, and perhaps schedule information, such as minutes behind or ahead of schedule, desired and actual ground speed or desired and expected arrival time.

General Electric states that the choice of how much information is presented and how that presentation is made probably "will be based on economic considerations" as well as upon operational convenience.

Under consideration are a series of horizontal panels, each indicating a track and different levels of altitude. Lights would glow as a plane traveled along the 50 miles in its block, tracing its progress and that of other planes on its same path, or above and below it.

It is also proposed to apply the Tricon responses to radar scanning equipment to capture a picture of the airway. Any unequipped aircraft along the way could be spotted in this manner (only specially equipped planes can fly the Tricon paths), and traffic control would be eased in landing zones.

On the ground the controller can simply dial a number corresponding to an aircraft's position and punch a key denoting the command. The command, pulse-coded, is sent automatically at that proper point in the triple coincidence sequence so that only the desired aircraft receives it. The plane automatically acknowledges the command. Thus the ground controller knows the order has been received. It is possible to send commands to one given point in space and to send other commands to all other points at the rate of one every second. Consequently, these commands can be pre-set to go out automatically and continuously to certain points. They then become true "roadsigns of the air," as they can be tagged "NEXT RIGHT TURN TO MINNEAPOLIS," or "YOU ARE NOW ENTERING THE NEW YORK APPROACH ZONE," etc.

This permanent message facility can be useful in many more ways and is just another startling phase of Tricon. One advantage would be in a letdown. Directions could be sent out at a certain point of the track, for instance, at the 5,000-foot level of an outside path, at five or 10 miles from the field, which would say "DESCEND." Along the approach route the plane would get signals saying "HIGH" or "LOW," depending upon whether the rate of descent was too slow or too fast. The plane then would be at the proper plan position, heading, altitude and even approximate glide path to enter a GCA or ILS channel.

Dr. Alvarez and G. E. electronic experts claim that the system will do away with the current altitude stacking of airplanes over a terminal airport during bad weather. They say that Tricon will establish regular en route lanes and make possible the orderly entry of aircraft into the field; that the ability to establish tracks of any curvature makes it possible to set up traffic patterns with high degrees of accuracy; that establishment of alternate approach paths in case of wind shifts is immediate; that the system allows rapid communication to aircraft when speed of command is paramount; that a pre-set command system could establish fixed control blocks, and that separate radio frequencies could be used for en route navigation and for terminal areas, thereby making for more safety.

Tricon also may be used for medium and long distance navigation. It can establish lines of position, rather than discrete points, by eliminating one of the ground stations and simplifying the other two. This is similar to an omni-directional range, except that Tricon is inherently more accurate. The pilot could receive left-right indications about the lines of position and hook up to his automatic pilot.

To give distance measurement, the round trip time of the command system

interrogation pulses can be used.

The private pilot is not forgotten in the study, although it is admitted that Tricon is mainly for commercial and military users with more money to spend than the average pilot.

Basic Tricon equipment is the navigation receiver, with counting and indicating equipment. Weight is about 35 pounds, but can be carried by most aircraft equipped for instrument flight. With this equipment the private airman can fly regular Tricon tracks, using routine communication channels to report his position.

A summary in the G. E. report on Tricon says the system offers these direct and indirect benefits to the private pilot:

A. The extremely small radio bandwidth required automatically frees a large portion of the spectrum for possible use by the private pilot. This frequency spectrum has previously been conceived as unavailable.

B. The basic airborne navigation equipment is very light, considering what it does, and can be carried by those private aircraft which might expect to be cleared for instrument flying.

C. The accuracy of Tricon is such that scheduled airways need not cover a large portion of the airspace. Thus there can be a useful number of secondary highways available to the private pilot.

D. The push-button communication feature provided by the Tricon system eliminates most of the voice communication usually necessary for scheduled airline operation. This gives the controllers more time to deal with problems relating to unequipped aircraft. It also helps free the radio spectrum.

The system is declared to represent a higher order of accuracy and control flexibility than has been specified by the Radio Technical Commission for Aeronautics as a basis for establishing an air traffic control system.

Tricon adherents state their biggest advantage is that the system has accurate, well-defined tracks placed in space for anyone to use. They can't be tampered with by the pilot and he can't possibly believe himself at one spot while he actually is at another.

Airborne equipment, including complete automatic pilot hook-up with Tricon instruments, is estimated to weigh about 95 pounds installed. Cost has not been determined as yet.

Ground equipment requires the installation of three transmitters for every 50-mile airway, but only one additional transmitter is required for the next airway section. Averaged out over the entire system, this would mean about two stations for each block. Time sharing between the two airway sections allows the two minor, or slave stations to serve both. A command transmitter-receiver station would coincide with an airport control tower or operations room.

Admittedly, Tricon ranges will be expensive to install but the actual costs have not been set to date. Many believe the advantages will well outweigh the cost.

Likewise the system is costly to perfect. It will take time and it is doubtful that the first working model will be completed for test purposes before the year's end.

However, some savings will be effected through ease of operation and maintenance, not to mention the savings in lives and costly equipment for which the system was designed.

When he had completed the plans, Dr. Alvarez disclosed them first to T. P. Wright, administrator of Civil Aeronautics, who is said to have seen the possibilities immediately. His favorable reaction encouraged Alvarez to take his invention to G. E. engineers who were amazed at the advantages it offered and the things it can do.

Tricon does practically everything except serve the pilot's coffee—but after all he has pretty little girls in uniform for that. END

Report from Washington

(Continued from page 27)

Colonel Hank

The Air Transport Command and Washington are going to miss Lieut. Col. Henry T. (Hank) Myers, Truman's pilot of the *Sacred Cow* and the *Independence*. Colonel Hank recently resigned to return to civilian life and his old love, American Airlines. A lot of people thought there was some mystery about this resignation but Hank tells us that his quitting, like everything else he's ever done, was sincere, normal and

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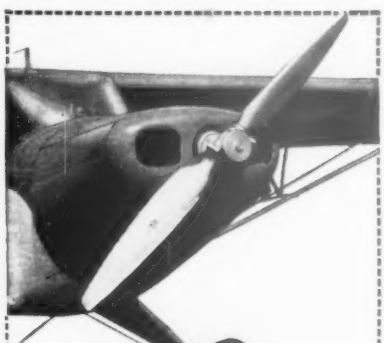

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Hank thinks the President is a great guy. It's mutual. The President is sorry to see him go, and vice versa. But it may be expected that the man in the White House, loving as he does simple pleasures, also understands and perhaps envies Hank's reasons for quitting. The colonel got married a few months ago and more recently bought a home near his old base, Fort Worth.

There's a lake on the property. "I like it south of the Mason-Dixon line," Hank says. "I'm not giving up flying, but I am hoping to concentrate on something else. I'm six years behind on my fishing."

Colonel Frenchy

Succeeding Hank at the tough job of flying the President and his VIP friends is a regular Air Force man—Lieut. Col. Francis W. ("Frenchy") Williams. Frenchy is 41, from Alameda, Calif., an ex-football player (college circuit), father of an eight-year-old named Diana, is a pilot who has never had an accident. Colonel Williams has more than 10,000 hours. He won his wings in 1932 after taking an AAF training course. He was with ATC throughout the war and for several months has been its chief pilot. Says Colonel Hank of Colonel Frenchy: "Don't worry about him. He'll do a better job than I did." Not that such a thing is possible—Colonel Myers' job was good.

Stall Warning

A stall warning device in the form of telegrams is being used by the Civil Aeronautics Administration in an effort to get Dr. Leonard M. Greene's stall warning equipment installed on lightplanes instead of wrapped in red tape. If you have had any trouble in this department, maybe you can help, although you are free to be reasonably skeptical of success, bureaucracy being what it is.

The story is this: CAA some time ago okayed Dr. Greene's stall warner. CAA inspectors and field workers were so informed. The bureaucrats among them immediately began to stall, find fault with the device, and to demand that putting it in a plane be considered a major installation (requiring an inspector's okay) rather than a minor one (which a mechanic can approve). Complaints began to pour in from the field as a result, and finally Charles F. Dycer, chief of the aircraft and component parts service of Safety Regulation, wired all regional administrators to get their red-tape artists to lay off.

He pointed out in December that CAA encouraged installation, and the less monkeying around about it, the better. Came the new year, and more difficulties. Out went another wire, this time from Al Koch, deputy administrator in charge of safety regulation. Subject to change pending further testing, installing a Greene device is a "minor alteration," Koch said. Any certificated mechanic can okay it. He added: "Please caution all inspectors against failure to comply with this policy and against making any derogatory remarks concerning this instrument."

END

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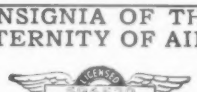
Silver Gold  Actual Size
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The Flying Auto Problem

(*Continued from page 18*)

higher power and wing loadings, with resulting economies in manufacture.

A good automobile must have four wheels, a wheel base and tread approximating that of the conventional automobile, space to seat four with automobile comfort, and baggage space equal to that of a car. It must have riding comfort, speed and acceleration equal to that of a regular automobile, must maneuver well in traffic and must not be freakish in appearance.

This means excessive weight and drag, and so we will have only a fair airplane. Here is where we begin to pay the penalty.

I studied three vehicles: a large, heavy automobile with added structure and power to fly; a light conventional automobile with added structure and power to fly; and a flying automobile built entirely to aircraft weight standards. I settled on the third but the first two might have interest.

Using a 700-h.p. engine, and a gross weight of 10,000 pounds, the large model would seat five, with 250 pounds of baggage and a total disposable load of 2,000 pounds. The light automobile type would seat four with 200 pounds of baggage and come to 7,465 pounds gross weight.

In the chosen type we have a four-place plane to carry 200 pounds of baggage within a gross load of 3,460 pounds. Of this, 1,180 pounds is disposable load and the weight of the automobile empty is 1,555 pounds. The flying structure added will weigh 725 pounds, and 2,280 pounds of the entire vehicle is added manufacturing weight. It will need a 250-h.p. engine.

My studies of costs show that, built to aircraft weight standards, moving parts such as engines, transmissions, etc., cost about the same per pound as aircraft sheet metal structures. This means that the vehicle with the least added manufacturing weight will be the cheapest, regardless of what percentage of that weight is moving parts. So, if we manufacture the complete vehicle to airplane standards as to quality and weight, it will be the cheapest vehicle. Unfortunately, no conventional automobile taken right from an assembly line will do. Major changes are required throughout, with especial attention to streamlining.

How to get a good ride out of an automobile weighing but 1,555 pounds? Virtually everything but the essential airplane controls must be in the automobile—fuel, passengers and baggage, and that weight must be distributed carefully to produce a maximum moment of inertia in pitch and a comfortable ride.

The center of gravity of the car should be about halfway between the front and rear wheels. The center of gravity of the airplane should be just forward of the rear wheels. It is very favorable to the airplane to have its load on or near the center of gravity, and that would dictate placing the automobile load just forward of the rear wheels, where the plane center of gravity is located. That

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in turn places the engine at the front of the car, the transmission and differential at the rear.

In such a vehicle there are arguments for using one engine for the car and another for the airplane. One fact, I think, settles this argument. A plane engine left unused for long periods at the airport deteriorates more rapidly than one in more constant use. Thus, if we can use the same engine for both purposes we can be sure it will be kept in better condition. But this decision brings along its own special problems, to be discussed later.

With the disposable load back near the rear wheels, we have good conditions for flying but bad conditions for driving as an automobile. This requires that the weight we intend to add in flying component parts must be behind the rear wheel, and this determines the general arrangement of the airplane.

The wing a. c. is slightly ahead of the rear wheels. Control surfaces will be carried aft of the wing with a connecting fuselage deep enough to fair into the automobile body.

One remaining tough problem is location of the propeller. Owners would not like it on a pylon above the hood. Twin propellers on the wings would be expensive and heavy; twin booms with a pusher propeller between them give high drag and low propeller efficiency. That leaves us the logical place for the propeller—behind the rudder. Here it has also the least complicated power transmission system, a simple long shaft with universal joint. And in this position the propeller is left safely at the airport when not flying.

Landing gear must be designed. Wheels, brakes and tires for this dual purpose require development but I think this involves no particular difficulty. Shock absorption and spring rate are tough chassis problems, what with the variable loads, roads and landing and take-off conditions. These conditions vary so widely that both variable spring rate and variable damping rates will be necessary. These problems are not insurmountable but they'll take time.

Ride is important and thus unsprung weights must be kept to the minimum. I prefer a sprung differential, with rear axles hinged to the differential such as has been used successfully on small European cars. Front wheels should be individually sprung and could be mounted on vertical cantilever airplane type shock struts.

With the four wheels operating in fender wells and partly retractable, we can reduce drag and still have a usable landing gear when partly retracted.

We must greatly reduce the controls necessary in this vehicle if normal people are to use it. The normal automobile with a radio has 10 controls and an airplane with radio has 12. We can combine many and reduce the total number. With castering wheels and the rear propeller, this can easily be a two-control airplane, eliminating the rudder and allowing use of the conventional automobile floor controls for other purposes. Automatic propeller adjustment, automatic engine cooling control and automatic flap control all are both desirable and feasible. The shift from automobile to airplane use can be made a part of the operation of mounting the flying structure on the automobile. The ground driving system can be used to assist in take-off and the clutch can be disengaged and locked in that position while in flight, using the clutch pedal.

That leaves six controls over and above those of a car: elevator, trim tab, throttle, mixture, chassis retraction and ride control. These are quite easy to design, and all but the trim tab, which is better mounted on the ceiling, will be put on the dash.

Assuming most flying in this vehicle will be straight cross-country without precision maneuvering, we can use the shift lever while in flight for operating the elevator. In most flight attitudes this control can be kept in one position, using some easily-overpowered type of detention such as controlled friction. This would eliminate the need for an elevator tab and control, reducing the number of added control functions to five.

There is no obvious solution to the problem of operating a 250-h.p. engine smoothly at four h.p. (the power needed to drive the automobile at 10 m.p.h.). Valve timing, manifolding and the very low mechanical efficiency are the principal problems. When we examine the problem, we must conclude there is no engine suitable for a flying automobile in existence today and that development of such an engine will tend toward a very high speed engine of eight or more cylinders with a stroke smaller than the bore.

Nor is there an apparent solution of the distribution problem, although fuel injection for the automobile with either fuel injection or carburetor for the airplane suggest themselves. We ought also to consider building a multi-cylinder engine in which some of the cylinders are cut out when operating the automobile. This could be done with two crankshafts and gearing, but owners should be meticulous fellows who would run their airplane engines a few minutes every day in order to keep them in the best possible condition.

For power transmission, we must have low weight, and the use of the following suggestions might make an acceptable system:

A combined differential and transmission with two forward and one reverse gear. A drive connection on the transmission to take an extended shaft aft to the propeller. A clutch between the engine and transmission gear set (not needed between engine and propeller) as good airplane performance dictates continuous connection during flight. A drive shaft between the engine and transmission. A drive shaft supported in the demountable flying structure from the transmission to the propeller.

There are innumerable detail problems that have not been mentioned. Any designer, naturally, will want to work these out for himself and he will find that their solution quite frequently depends upon each other. END

The Mail Box

(Continued from page 6)

went over the tree in a nose high attitude so that the prop wash helped blow the dust down, under the tree pictured in your magazine.

I have deliberately mushed a duster hundreds of times over wires and trees to blow dust into corners with the prop wash. Sometimes with weird effects, too. But I have never been fortunate enough to have a cameraman near to record them.

RICHARD MCGRAW

Dos Palos, Calif.

EX-GI PILOTS GET PINK SLIPS

In the September, 1946, issue you published an article entitled "Converted Aces" in which much was made of the bright future for ex-service pilots on the scheduled air lines.

First Officer Connery of American Airlines was used as an example. I should like to point out that First Officer Connery and 149 other ex-GI pilots were laid off Christmas Eve of 1946. Since that date American Airlines has laid off approximately 200 more pilots. Unfortunately, nearly all of these men are ex-service men. On December 22, 1947, 103 were told that their services were no longer required. This last cut removed all the ex-service pilots hired by American Airlines since the end of the war.

I suspect the same thing has been happening in the other airlines.

RAMON DORSEY

Nashville, Tenn.

● FLYING finds no evidence to warrant a charge of discrimination against ex-GI pilots. The reverse is true. Airlines have hired hundreds of former military pilots, and separation policies have been solely on the basis of aptitude and seniority. But because most ex-military pilots lack seniority, they're the first to be hit by seasonal fluctuations in airline personnel. Airlines call it a "furlough" policy, but what actually happens is that pilots are laid off, without pay, during dull seasons. However, they retain their seniority.

So far as the hiring and firing picture goes: Since June, 1945, over 99 per cent of pilots employed by United Air Lines have been ex-servicemen. American and TWA have policies of hiring "almost exclusively from ex-GI ranks." American Airlines reports that 253 pilots have been permanently released during the period mentioned in Reader Dorsey's letter. In the past six months, United has separated 34, TWA none.—ED.

FIRST HELICOPTER JUMP

Concerning John C. Redfield's letter entitled "First Helicopter Jump?" [January issue], I can state that the Philadelphia helicopter bailout of Ensign Greathouse of the U. S. Coast Guard and his mechanic occurred on September 25, 1945. I was an eye witness.

Fortunately for all concerned, the helicopter was at an altitude of about 5,000 feet over the comparatively open area of South Philadelphia, just north of the Navy Yard, when the rotor broke loose. The pilot told me, "I looked up and saw the rotor was gone and didn't see any

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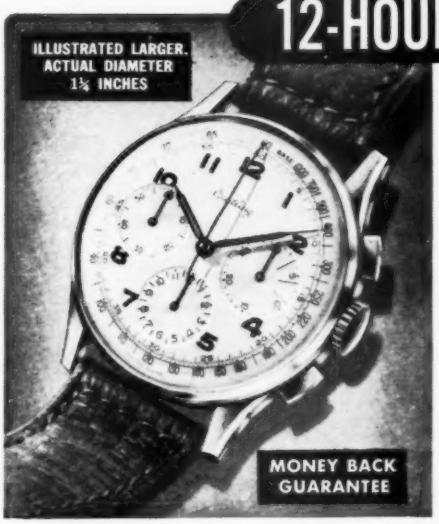

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reason for us to stick around any longer!"

I do not believe they went out through the Plexiglas, as the door, which is jettisonable, was picked up several blocks from where the boys landed and over half a mile from where any of the other parts of the helicopter were found. The complete rotor assembly, intact until it hit the ground, spun slowly down like a great maple seed, landing about 20 seconds before and about a half mile from the crew in their parachutes. It was quite a show.

R. S. BARNABY
Capt. USN (Ret.)

Philadelphia, Pa.

TOUGH EDITORIAL

Congratulations! In my opinion, "An Army Streamlined to 1939" [December issue] should appear on the front page of every American newspaper. The time to stop a fight is before it starts.

FRANK E. WALSH

Chicago, Ill.

I have never before written to a magazine or newspaper but your editorial made a hit with me, perhaps because I enlisted in 1939 and was a ground crewman in our pitifully inadequate Air Corps at Hickam Field, Hawaii, on December 7, 1941.

Pearl Harbor was a skirmish compared to what could happen to the U. S. today or tomorrow.

Your ideas on universal military training are thoroughly sound. Six months or even a year will not prepare a man to take a job with the AF. Technical knowledge and background require that a man put in several years training and this can be accomplished only on a career basis. I have been a military pilot for five years and an instructor, and it is my sincere opinion that a man requires three to four years and at least 1,800 to 2,000 hours in various types of aircraft under all conditions before he becomes an asset to the AF as a pilot.

Yet, AF pilots with 2,000 or 3,000 hours who desire to make a career of flying with the AF applied for but did not receive regular Army commissions. These men, still on active duty, won't be inclined to do their best when they can expect only a "brush off" in a few years.

It is also my sad observation that the primary function of the Air Force is being neglected by relegating pilots to administrative jobs, since it takes only a short time until in-the-air sharpness and proficiency suffer from lack of constant flying practice.

Your views on an adequate Air Force should be "must" reading for AF officers and Congress.

1ST LIEUT. A.C.

Middletown, Pa.

Your editorial is, to my way of thinking, the clearest thinking on national defense that has been put on paper since the war's end.

Practically everyone I have talked with has been worried and mystified by the policy which apparently has left our nation weak and defenseless. We have been living in the false hope and half belief that things aren't as bad as they really seem and that somewhere there are people in the Government who are planning, watching and building. It is becoming more and more sure that there is no plan, no defense.

You have made a good start. For the sake of our country keep it up—and may it not be too late.

H. W. SHOWALTER, JR.

Winter Park, Fla.

KEEP IT STANDARDIZED

An advertising brochure for a four-place plane states that the company had a 200-h.p. engine re-rated at 165 h.p. at cruising r.p.m. It published the lower figure as the power of the craft which gives it an apparently phenomenal cruising speed. It also states that there is 185 h.p. actually available to the pilot. In my opinion, this would be the conventional one to publish.

I maintain that this method of reporting, while true, breaches so widely from convention as to make one speculate on what the effect might be. Under the "old" system the potential buyer could compare horsepower and cruising speeds and come out with a pretty good idea of the efficiency of various planes. Today it is possible to see two makes of very similar aircraft claiming the same operational costs per passenger mile, yet one quotes both a higher horsepower and a lower cruise. Even the layman is apt to ask why. Having it all explained to him by a disinterested party may institute another "bite," for which our industry is already too well known.

I say, for one small voice, let's keep it simple and standardized.

ARTHUR SAGER

New York, N.Y.

END

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33, 34—GARLAND D. FRONABARGER
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38—HAL MORRIS, JOE TILLOTSON, EDDIE MILLER PHOTO SERVICE
39—EDDIE MILLER PHOTO SERVICE, C. E. RAGLAND, EDDIE MILLER PHOTO SERVICE
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43—GOODYEAR, GRUMMAN, USN
44—MAX KARANT, J. H. FITZGERALD
56—Y. BERLINER, BOEING
74—GENERAL ELECTRIC

Wing with a Slant

(*Continued from page 35*)

dles. The small pump has enough force to pull the wings back to normal with little manual effort. In flight, the lift of the wings themselves will extend them upon release of a cockpit locking device.

The pump weighs a little more than five pounds and the extension devices weigh about a pound each. Metzler says he can install the equipment on any strut-braced plane for $100—less if a mass demand arises. He is now trying to interest lightplane manufacturers into building his device into some of their models.

He believes his gadget is worth its cost for four reasons:

1. Plane is more stable in gusty weather. (We flew in it on a very gusty fall day, and agree.)

2. Enables pilot to trim ship and fly hands-off cross-country, using rudder pedals only.

3. Adjusting trim, you can make perfect turns up to 75° without stick.

4. Metzler claims that in fog or a heavy overcast pilots can relax and quit worrying about stalls so long as they watch the airspeed indicator and compass. He also claims that his plane with a dihedral of 10° is practically stall-proof. It mushes up like an Ercoupe, dips one wing, then resumes level flight without any trouble.

Metzler tried to interest the Army in the device for liaison planes. With hands free, a pilot would be able to make notes, take pictures and generally work with his hands, forgetting his stick. Army wasn't interested, he says.

To install his strut extension, Metzler cuts the base of the strut and welds on the extension. To move the wings up and down, all he has done is to loosen the cotter pins holding the spars at the base of the wings. When the dihedral is increased, the top of the wing fabric wrinkles slightly.

He is also experimenting—the whole device, so far, has only a CAA experimental license—with rubber cushions in his lengthening device to ease the shock of a sharp gust. He cut the cushions, doughnut style, out of an old inner tube. It is interesting that NACA has also experimented with devices which would ease the shock of air gusts. Less air-sickness and smoother flight would result.

Metzler believes that dihedral could be increased to 30 per cent with beneficial effects, but this would mean changes in the basic design of conventional lightplanes.

He claims that he has picked up three or four miles per hour cruising speed by increasing the dihedral.

H. H. Fraley, chief pilot at Congressional Airport, Washington, D. C., an ex-Navy instructor with 5,000 hours, took a demonstration flight with Metzler recently and returned impressed. "Increasing the dihedral certainly increases stability and smoothes out the flight," Fraley says. "There is no need for ailerons, you are hands-free, and the air speed goes up slightly." END

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Want a Free Airport?

(*Continued from page 34*)

to the half-million dollar airport which would be transferred to the city without cost, insisted that a $115,000 municipal bond issue be passed, to provide for the CAA-required changes. Just as loudly, a conservative faction in Cape Girardeau set up a howl, addressing letters to local newspapers and starting a whispering campaign: "Why should we spend $115,000 so a bunch of wild kids can play with airplanes?"

Charles A. Juden, chairman of the airport board, took the lead in marshalling voters. And an ex-Army flyer, 29-year-old Rush Limbaugh, began a personal job of combating the anti-airport drive. As secretary and publicity chairman for the board, he enlisted the local radio station, the newspapers, the American Legion, the Veterans of Foreign Wars, the labor unions — even the Business and Professional Women's Club. Speakers were sent to civic groups, and resolutions were passed in favor of the issue. The measure passed by a 3 to 1 margin.

But the bonds weren't purchased in the usual way, through a bonding house. Civic leaders, including Airport Board Member H. I. Himmelberger, Clyde Harris of the First National Bank, and Walter Oberheide of the Farmers and Merchants Bank, worked out a plan by which local banks purchased the bonds at low 1½ per cent interest. The banks also agreed that the board did not have to issue the $115,000 in bonds immediately but could issue the bonds as money was needed. That saved the city a substantial amount in interest—and demonstrated the possibility of similar savings by other cities.

With the $115,000, the additional land was purchased and enough money remained to build a 2,000-foot extension to the existing hard-surface runway, and a 4,000-foot east-west sod runway.

Consolidated School of Aviation, which had been operating at the smaller landing strip near Cape Girardeau, decided to move into the municipal port. It rented two hangars, two of the buildings, and all of the equipment on the field (and that included a crash truck, fire truck, air compressors, tools and tractors with mower attachments). Rent is $400 per month. Consolidated must maintain the entire field, keep it mowed and in operating shape.

Only item of maintenance left to the city is major runway repairs and exterior repairs to buildings.

Still operating full-blast, the Municipal Airport Board rented one of the remaining hangars to the Navy Reserve for an armory — and gained another annual rental fee: $3,600. Right now, it is negotiating with the Missouri National Guard for a similar setup.

The State of Missouri kicked in with $10,000, the amount prescribed by law for cities attempting to construct airports. The Government is committed to furnish 25 per cent of the land purchase costs and 50 per cent of the city's runway and landing area improvement costs. Recently Parks Air Transport, Inc., was authorized to establish a feeder line between St. Louis and Memphis which will serve Cape Girardeau.

Right now, nearly everybody's happy in Cape Girardeau. Limbaugh points out:

"Interest in aviation has increased 100 per cent since the bond issue passed overwhelmingly and since we have rented our airport for something like $10,000 a year.

"The taxpayer won't be out one dime on the bond issue. The annual rental is more than enough to pay off the principal and interest on the $115,000 bonded indebtedness."

And the Airport Board reports: "There's no reason for the wide scale record of defeated airport bond issues throughout the country. We were able to get the voters' okay on this deal because we sold the voters on the need for an airport and on the idea that it was a good business deal. The reason so many towns are piling up a string of defeated airport bond proposals is that their aviation backers don't organize for winning the elections."

The Cape Girardeau plan for winning the election was simple: Airport backers enlisted aid and conducted a telephone poll of all registered voters. They lined up persons who actively favored the proposition and tabulated names of all persons who were undecided. No effort was made to sway persons actively opposed to the airport acquisition. Then the board saw that all undecided individuals were personally contacted and that they were given figures to show the practical and financial advantages to be derived from a municipal port. Election results demonstrated the effectiveness of the approach.

That's the story at Cape Girardeau, and it pretty well fits many of the cases on surplus airport disposal under the recently-enacted McMahon Bill. Procedure on acquiring the ports is simple, though still circumscribed by Governmental red tape:

After Army or Navy declares the field is surplus, the WAA makes it known that the airport is available to private interests. If local governments are interested they contact WAA, requesting certain parts of the field. The Civil Aeronautics Administration then surveys the site and decides how much of it can be devoted to peacetime aviation without being a white elephant. Surplus portions of the field (parts which might be a handicap financially to civil groups operating an airport) are put on sale.

Then, without cost, the remainder of the field and all maintenance equipment are turned over to the local government by WAA. And another civil airport is ready to operate.

Certain provisos, however, are contained in the law. Monopolies aren't permitted on the fields. They must be operated on the "free enterprise" system. Neither can navigational aids be built on runway approaches or elsewhere near the field where they would endanger flying. Twenty-five percent of the facilities must be available to the Army or Navy when desired in peacetime, and the entire operation can be used by the Federal Government in case of emergency.

On the whole (as attested by the Cape Girardeau case) the entire disposal system seems to be operating fairly well, although complaints pile up regarding bureaucratic inefficiency and slowness in the transactions.

One thing's certain, however. Millions of dollars worth of airports—otherwise impossible for local governments to acquire, are now available through the courtesy of Uncle Sam. END

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NEW 27" Tires, $9.00 used, perfect, $3.00, Tubes, $2.50. New 10.00 tires, $5.00, tubes $1.50. Recapped navy 30x5, $9.00. New 10x3 $5.00, tubes $1.50, new 18x8x3 $8.00, 6.50x10 $9.00, 8.00x5 $6.00, 5.00x4 $5.00, 6.00x6 $8.00. A-6 Boots, $5.00. New 35x15x6 $15.00, 17.00 $5.00, new smooth 27.50x8.90 $6.00, treaded $10.00, tubes $2.50, new 12.50 $5.00 channel $6.00, tubes $1.50. New 22x9x6 $7.50, tubes $3.50. 8.50x10 $9.00, 7.50x10 $9.00, tubes $2.00. New 8.00 $5.00, tubes $1.50. New Schehler Marvel carbs $15.00. New Thompson exhaust valves. Continental W670, $3.00. Marvin Northrop Aeroplane Co., Minneapolis 1, Minn.

AVIATION EQUIPMENT

COMPUTERS, Dalton Model G, which straps to the leg, leaving one hand free, (formerly sold for $50.00) now only $7.50; Rolaire deluxe map cases for safe, easy pilotage, $14.95; Model G Rolaire, $9.95; AAF-type A-2 computer, $2.00; Weems plotter for measuring courses, speeds, distances, $2.00; New Model C American Airlines computer in leather case, with instructions, $5.00; E-6B Army computer, most widely-used computer in aviation, $10.00 (with leather case & instructions); and from our large war surplus stock; Army D-12 aperiodic compasses for aircraft, airports and marine vessels, $12.50; astro-compasses, with instructions, now only $8.75; Longines pocket compasses for sport or work, new, $1.20; Dietzgen 6-inch protractors, 20c; Elgin pocket stopwatches, like new, $12.75; Bausch & Lomb sextants, $37.50; like new F-8 aerial cameras, a "best buy of the month" at $175.00; pilots' briefcases, $6.50. Inquiries about new dealer agencies welcomed. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

E6B COMPUTERS. Steel Construction with leather case. New, $8.00 postpaid. Used, $5.00 postpaid. Dozen, $45.00. Southwest Supply, Sanderson, Texas.

ALL wool gabardine L-1 flying suit, nine zippered pockets, in all sizes. While they last—$7.95. Your last chance to buy this garment at this low price. R.A.F. Manufacturing Company, 6 East Lake St., Chicago 1, Illinois. Buy direct and save.

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A-2 TYPE flight jackets with genuine Mouton fur collar. Body make of the finest front quarter horsehide. All sizes. Priced at $19.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

GLOVES B3A. New, AAF Flying Gloves, dark brown unlined genuine kidskin leather, all sizes $2.95 pr. Same glove in natural buckskin $3.95 pr. G.I. Gloves, khaki wool, leather palm, $1.95 pr. Regular wool knit glove, brown or maroon $.95 pr. Gauntlet, one finger mitten type, baby lamb lined, dark brown goatskin leather, all sizes, $7.95 pr. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

A2 FLIGHT Jackets, Army type, dark brown horsehide leather, cloth lined, zippered, elastic-knit waistband and cuffs, sizes 34 to 44, $18.75 or with dark brown mouton fur collar, $20.75. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

NAVY Intermediate Flight Jackets. New, genuine dark brown goatskin leather, mouton fur collar, bi-swing back, celanese lined, zippered, elastic-knit waistband and cuffs, 34 to 48, $35.00. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

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HELMETS, AAF, new, A-11 kidskin leather, chamois lined with sponge rubber earcups, $3.45 or ANH15 tan gabardine, $1.00. Sun Dodger Flying Caps, long visor, khaki or olive drab twill, $1.15. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

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B3 PILOT Jacket, Army type, sheepskin lined, dark brown leather, zippered $20.00. B2 Pilot Cap, sheepskin lined, long visor ear laps $3.75. Pilot Vest, sheepskin lined, $7.00. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

TIRES. Aircraft, new, 6.00x2 solid $1.25, 10:00 tail wheel $8.50, 8.90x12.50, $9.50, 5.00x4 $6.95, 6.00x6 $9.50, 7.50x10 $11.00, 8.50x10 $12.00, 12.50x4½ $6.00, 27" $11.00, 30" $21.00, 33" $23.00, 47" $30.00. Other sizes and tubes also. Complete new wheels, tires and tubes for AT6 or BT13 $65.00 per set; subject to prior sale. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

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FOR Patents and Trade Marks consult Z. H. Polachek, Reg. Patent Attorney, 1234 Broadway, New York 1, N. Y. Telephone, LO 5-3088.

INVENTORS: Without obligation, write us for information as to what steps an inventor should take to secure a Patent. Randolph & Beavers, Registered Patent Attorneys, 372 Columbian Bldg., Washington 1, D. C.

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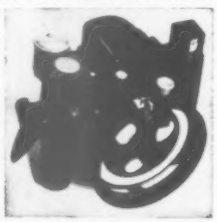

FAIRCHILD A-10 SEXTANT (illustrated, right), adjustable bubble, manual averager, lights for night use. Complete with all accessories. Good condition, **$12.50**; new, **$47.50**.

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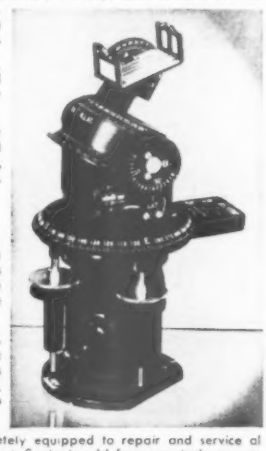

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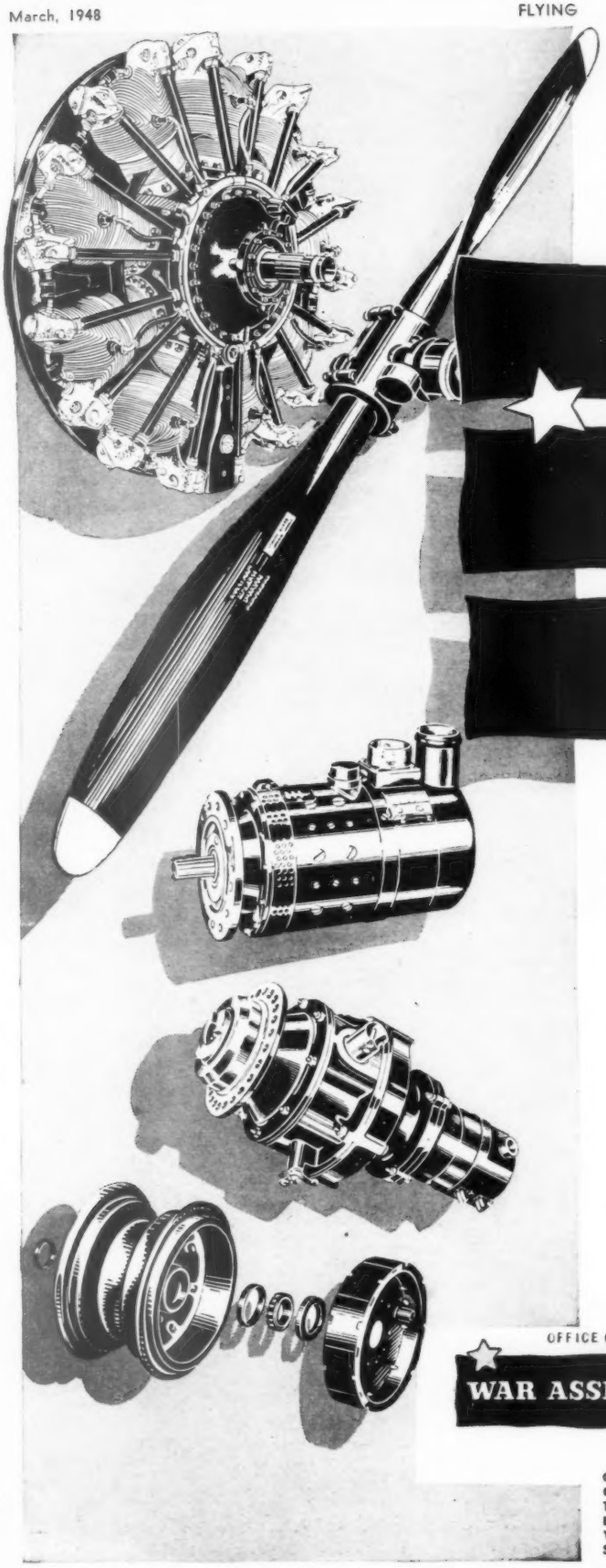

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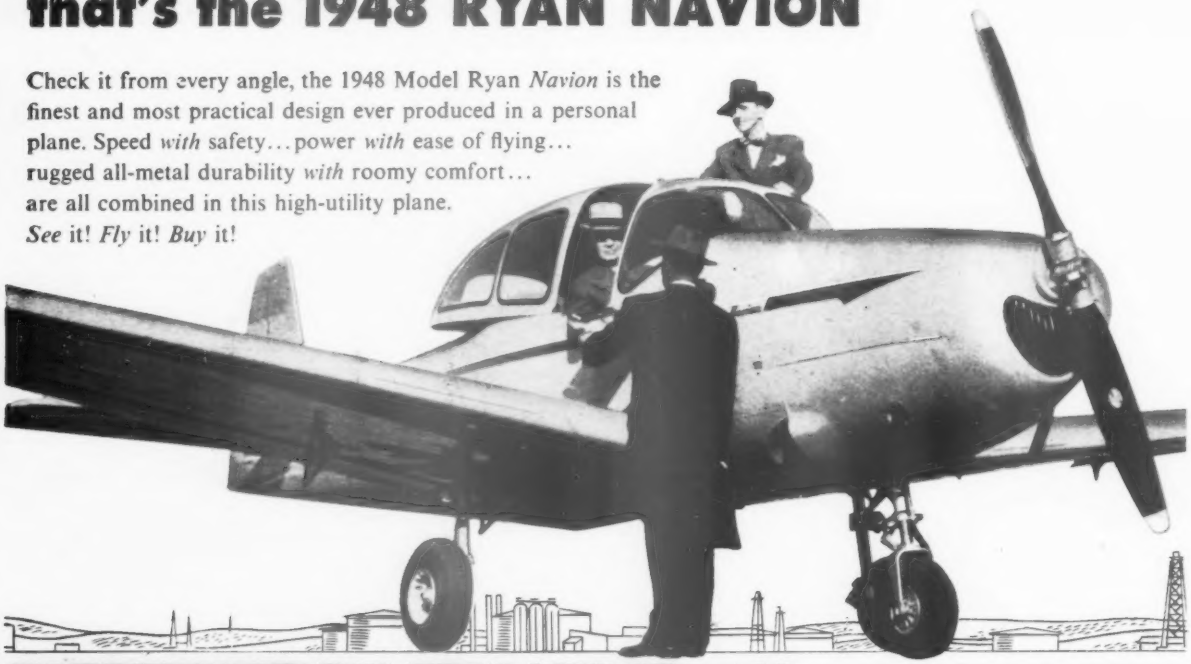

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